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The differences between the railways centering at Chicago and their employees over wages and conditions of employment are being submitted rapidly to arbitration. The switchmen's strike in the Northwest has been won by the railways; and there is at present no reason to fear that any more strikes will take place. This satisfactory situation has been brought about mainly by two causes. One is, that while the railway managers have refused to grant unreasonable demands for increases in wages, they have met employees in a conciliatory spirit, have indicated a disposition to give them all that is fair, and have proved their fairness by showing uniformly a willingness to submit the determination of what is fair to arbitration. The second cause, is the policy of publicity that the railway managers have adopted. Heretofore, the managers and the representatives of the employees usually have agreed not to tell the press anything about the progress of their parleys. Every newspaper man who has "covered" such conferences knows that the railway men have conscientiously kept these agreements and that the artful representatives of labor have systematically broken them. Press and public having only labor's side of the controversies, they naturally have usually been against the railways. This time, the general managers, through O. L. Dickeson, special inspector transportation of the Burlington, have from day to day frankly taken press and public into their confidence. The results have been that the railways usually have got a "square deal" from the press and that public and railway employees have understood the matters in controversy. The labor leaders, in consequence, have feared the effects of and have avoided such arbitrary and reckless action as precipitated and lost the switchmen's strike in the Northwest. The developments indicate that the railways often in the past have made tactical blunders by fearing and avoiding publicity. It is always apt to be suspected that when men love darkness their deeds are evil. When the railways have right on their side they can afford much oftener than their managers have been disposed to think to let in the sunlight on their affairs.

The last quarterly government accident bulletin (for July-September, Bulletin 33) reprinted in this issue, records 56 passengers killed in train accidents, which is eight times as many killed in the last preceding quarter (April-June), and 6 per cent. larger than the number reported in July-September quarter of 1908. Persons who may have assumed that the very low record of passengers killed (7) in bulletin 32 indicated a decided permanent improvement will now have a rude awakening. The three principal accidents in bulletin 33 are the colision on the Spokane & Inland at Gibbs, Idaho, July 31, in which 16 passengers were killed; on the Denver & Rio Grande at Husted, Colo., August 14, killing eight, and on the Pittsburgh, Cincinnati, Chicago & St. Louis at Chicago, September 28. The circumstances of these and other collisions in this bulletin call attention to the fact that with all the progress that has been made in block signaling during the past few years the old custom of trying to get along without it still prevails in many places. The Spokane & Inland is an electric road and, like most other electric roads, seems to have assumed that by some special dispensation of Providence such roads could employ the methods of 50 years ago without incurring the penalty which, under the same circumstances, would be visited on a steam railway for taking the same risks. The Denver & Rio Grande is a road which, at last accounts, had not seen fit to adopt the block system on a single mile of its lines. The details given in this bulletin of one of the collisions in Table 2-A (collision No. 12) illustrate in a striking manner the complicated combination of chances that trainmasters and train despatchers will take, even with passenger trains, when they are under stress, in order to move a large number of passengers over a line not provided with adequate facilities. Colision No. 3 shows how easy it is to run trains into each other, even on a road where the space interval is in use, unless the most rigid regulations are prescribed for all possible emergencies. The collision in which the six drovers were killed occurred within the city of Chicago, on a line where the methods of operating appear to be much the same as when the stock yards were established, in our grandfathers' day. The butting collision on the Nashville, Chattanooga & St. Louis September 15 (reported in our list for that month) appears to be entered in the bulletin table as No. 24; an appalling disaster, yet requiring only four lines (28 words) to tell all that the government can learn about its cause. Another bad collision which appeared in our record, that at Majave, California, August 25, killing 12, seems to have been omitted from the bulletin; for the reason, probably, that most of the persons killed were trespassers. Casualties to trespassers are not reported to the Interstate Commerce Commission until the end of the year.

THE RAILWAY AS ULTIMATE CONSUMER.

These are days when the "ultimate consumer" is bulking big in the political economy of the land. He is portrayed, and with much essential truth, as a kind of ulterior victim against whom is projected, as a kind of economic buffer, every item in the cost and distribution of a product until it is consumed. A more logical conception, however, of the final consumer is derived from the metaphor that likens him to one of many segments of a circle in which production and consumption blend. Take, for example, the worker on a salary. He eats food, he wears out clothing, he is a consumer in many other

ways. But, on the other hand, he produces and sells service; and that service, in turn, is elemental in the ultimate price of a product after it has run its round of processes and reaches a market, to be bought by the consumer out of salary or wages. Ideally in this endless chain of production and consumption the links should be alike in such matters as profit, comforts, satisfactions. In practice they are not alike and never will be. Equations in the vast and complicated round of things produced and things consumed is impossible. But there may be inequalities so unjust that the consumer, as such, has a right to complain and seek a remedy—not as "ultimate" consumer exactly, but as one who finds himself the victim of unjust economic ratios.

Using, however, the ultimate consumer as denoting an idea rather than a rigid fact, then that idea manifestly applies to corporations as well as to individuals. The chartered body is consumer and producer like the human body. And in that double character it is interesting to note where the railway stands.

The railway corporation is, in first analysis, the creator of a simple product—transportation of freight and passengers—and the secondary analysis does not much modify the proposition. A few railway corporations own coal mines and directly or indirectly sell the product. Others may own street railways and power houses, and incidentally sell power and light. Still others may own different properties that involve mercantile transactions. But all these are mere fringes on the main business of transportation. A single product with almost no by-product is the output of the railway's business. This does not mean that the business itself is simple. On the contrary, it is most intricate, reaching out into manifold processes and problems. We are referring to the railway, not as an organization but as measured by the one single commodity, transportation, that it sells, while a single factory may make and sell a hundred commodities or one commodity in a hundred forms. Or, turning to the mercantile side, contrast the one product of a railway with the output of a big department store.

But how about the railway as consumer? If any consumer owns the "ultimate" adjective prefix, surely it is the railway. The range of its consumption is limitless, and more so probably than of any other corporation, big or little, that can be named. It covers iron, steel and wood in endless variety and amount; service on a great scale expressed in wages and salaries; the infinity of materials that enter into a great station, bridges or rolling stock; coal, not in tons but in hills, rivers of lubricating oil, electric consumption on a scale that requires new units of measurement. The 97 mighty pages of the new tariff lie before us. They contain 14 schedules enumerating more than 3,000 commodities, counting different grades of the same commodity; and in the 14 schedules the railways are large consumers of more than half. The railway's consumption, too, is well-nigh absolute, and there is no salable residuum except from the scrap heap. In that respect the railway is not far removed from that "ultimate" consumer of foodstuffs who is just now so vividly in the limelight.

To summarize the economic case, the railway, simple and limited as a producer, with but one commodity on its counter, is, as a consumer, expansive, varied, ramified. The study might lead further and with much more suggestive sequels. One may fitly ask, for example, how far the railway, while carrying the consumer's burden, has been denied the producer's remedy and offsets. While consumption has steadily increased its price, how about the price of the railway product, transportation! Has or has not the railway been allowed to "level up" to other producers, and has it not, under the compulsion of authority and a public feeling quite the reverse of altruistic, been forced the other way and downward? But such queries are trite. More impressive is the wider generality that through a long period the railway has been hit by both the producing and consuming powers. The "ultimate" consumer individualized is just now in bold perspective. But is he really more to be considered as a mere food-eating personality than as stockholder in a railway whose dividends buy his food? And will he, as citizen, deny to the railway, bearing as consumer the same burdens, the redress which he claims for himself? The reasoning shows the whole distance between the shipper who protests against higher freight rates and the union that demands from the railway higher wages while it boycotts high-priced beef.

SENATOR BAILEY ON COST OF SERVICE VERSUS VALUE OF SERVICE IN RATE REGULATION.

United States Senator W. J. Bailey, of Texas, is recognized as one of the ablest constitutional lawyers in the country. The duel between him and Senator Spooner of Wisconsin over the constitutional phases of certain parts of the Hepburn bill was the most memorable debate in Congress in recent years. On January 20 Senator Bailey delivered before the New York Bar Association an address on "The Power to Regulate Transportation Charges by Statutory Enactment," which deserves to be read by every railway lawyer and traffic manager and by every railway commissioner. He reviewed the decisions of the Supreme Court of the United States bearing on the regulation of the charges of public service concerns from Munn *vs.* Illinois down to Cotting *vs.* Godard. As a result of this review he arrived at the same conclusion that was reached by the *Railway Age Gazette* in an editorial entitled "What is a Reasonable Rate?" which was published in our issue of October 29. This is, that the true test, under the federal constitution, of the reasonableness of rates is not whether in the aggregate they yield to the railway a large return or a small return, or perhaps any return at all on the value of its property, but that the true test is whether each charge made by the railway is reasonably proportionate to the value of the specific service for the rendering of which the specific charge is made.

"In my judgment," said Senator Bailey, "a reasonable rate must mean one which affords the railway *a just compensation* for its *service*. If it means more than that, neither the legislature of any state, nor the Congress of the United States, has any right to compel the people to pay it, and if it means less than that, neither the legislature of any state, nor the Congress of the United States, has any power to compel the railway to accept it. In other words, I believe that the constitutional provision which restrains the railway when it comes to condemn my property restrains me when I come to use the railway's property."

The point made in the last sentence is of vital importance. It goes to the root of the entire matter. The states and the nation may restrain the railway from making unreasonable charges, while they may not regulate the prices of the merchant or the manufacturer, because the railway's service is public, while the merchant's or the manufacturer's business is strictly private. Since the states and the nation may regulate the rates of the railway, why may they not so regulate them as to prevent it from earning any return at all? Why may they not compel it to serve the public for nothing? The reason is, that the Fifth Amendment to the Constitution prohibits the federal government from taking private property without just compensation, and the Fourteenth Amendment prohibits any state from denying to any person within its jurisdiction the equal protection of its laws. Now, while the service which the railway renders is public, its property is private; and the Supreme Court holds that to deprive it of all return from the use of its property would be to take its property without just conpensation and to deprive it of the equal protection of the laws.

It is contended, however, that while the railway may not be required to render its service for nothing, it may be limited to a "fair return"; and in order to so limit it, it is proposed to make a valuation of its physical property, and then allow it subsequently to earn only the current rate of interest on this valuation, plus any additional investments that may be made

in the property in future. The theory that this may constitutionally be done is based in the language of the Supreme Court in Smyth *vs.* Ames, where it said that what the railway is entitled to receive is "a fair return upon the value of that which it employs for the public convenience."

But those who reason thus overlook two very important facts. One is, that the court did not say that this is *all* the railway may be entitled to earn. The other is, that the constitutional prohibition against taking private property without just compensation applies to the property of the railway in exactly the *same way* and to precisely the *same degree* that it applies to every other species of private property. The constitution does not say that "private property may not be taken for public use without just compensation; provided, that when railway property is taken a smaller compensation will be considered just than when other property is taken." Regardless of the use or ownership of private property "just compensation" for it must always mean the *same thing*. Now, if to provide, that a valuation shall be placed on a railway's property, and thereafter it shall be limited to a specified return on this valuation plus any additional cash investment it may make, is to provide for "just compensation" to the railway, then, it must also be that the private property of every other corporation and individual may be dealt with in the same way. Under such an interpretation of the Constitution, legislation may be passed providing that a valuation shall be made of all the real estate in the country, and that in future its owners' return from it shall be limited to the current rate of interest on this valuation plus any investment that may be made in future in permanent improvements. Because the railway serves a public use, it may take property by the exercise of the power of eminent domain. As pointed out by Senator Bailey, the constitutional inhibitions which disable the public from requiring the railway to render its service without reward are the same, and the only ones, which disable the railway from condemning land without paying for it; and, therefore, if these constitutional provisions shall be so interpreted as to enable shippers and travelers to force the railway to sell them transportation at rates based, not on the value of the service to the shipper or traveler, but on the cost of the service to the railway, then the very same interpretation will authorize the railway, when it exercises the power of eminent domain, to pay prices for the land which it takes which are based not on the value of the land, but on what it cost those from whom it is taken. As Senator Bailey remarks, "a good rule must work both ways!"

Many of those who oppose the basing of rates entirely on the value of the service do so on the ground that it may be almost impracticable to ascertain what is the exact value of any specific service. On this point Senator Bailey says in part:

> "It is undoubtedly true that we cannot determine the value of a railway service with the same certainty that we can measure cloth or weigh grain; but it is equally true that we cannot fix values and damages with absolute precision in any proceeding to condemn private property for a public use; * * * but it never occurred to me that we ought on that account to abrogate the rule which gives the owner the fair value of his property, and substitute, on account of its simplicity, a rule giving him his original investment with a fair profit. To reject the ancient and constitutional rule that guarantees private property against being taken for a public use without just compensation, and to accept this new and indefensible one of a fair profit on the investment because it is simpler and easier of application, is equivalent to saying that we will adopt an illegal and unconstitutional test for the purpose of relieving ourselves from the performance of a very tedious and somewhat difficult duty. * * * I believe I can demonstrate that the rule which we are asked to approve because it is a practicable one will produce almost endless confusion and injustice. It will permit the most palpable favoritism to some shippers and the grossest injustice to others; it will invite discrimination between communities and commodities; it cannot be equally and impartially applied to all railways, and an attempt to do so would disorganize our entire railway system and bankrupt many railway companies."

Senator Bailey has given the public what we believe to be the soundest and ablest exposition of the constitutional and economic phases of railway regulation ever made by a public man. That the views which he expresses ultimately will be adopted by the Supreme Court of the United States, if properly presented to it, can hardly, it would seem, be open to rational doubt. Their adoption by the Court would destroy the entire theory of valuation of railways and raise an insurmountable obstacle to all future attempts to deny to the railways the equal protection of the laws by arbitrarily limiting their earnings while imposing no restrictions on the earnings of most other classes of business concerns.

TWO GREAT NEEDS OF AMERICAN RAILWAY ORGANIZATIONS.

The tendency is toward the establishment of larger and larger railway systems. This makes ever more pressing two great needs of American railway organizations. One is the adoption of means for the development of increasing numbers of broad executives. The other is the decentralization of management.

On the railway of 100 miles the same man may be general manager, traffic manager and several other things, and get a wide variety of experience. A railway 1,000 miles long requires a specialist at the head of every department. The management of a railway system of 10,000 miles must carry specialization of the functions of its officers yet farther. Because it can do so, and can get or develop the best specialists, is one of the main reasons why it can be more economically and efficiently operated than ten railways of 1,000 miles each. But specialization can be carried too far; and on American railways it very commonly is. Special branches and departments must be well co-ordinated to produce the best results. That they may be so co-ordinated there must be convergence of authority over them somewhere; and this convergence must take place not only in an *office* with adequate power over the various branches or departments, but in a man in that office big and broad enough to give ample effect to its purposes. Such men will not often be developed haphazard, any more than will specialists in mechanical or engineering matters, or in the handling of freight or passenger traffic; and what is produced haphazard, whether roadway, rolling stock or men, will seldom be what it would have been if produced by intelligent provision. The only way afforded by the railway business to produce men who are big enough to be not merely freight or passenger men, but real *traffic* managers, not merely transportation, mechanical or engineering experts, but real *general* managers, is to give numerous men the opportunity to get a broader experience than can be gained in any special branch, and then to select for the higher executive offices those who best avail themselves of the opportunity, regardless of their special line.

This is not generally done now. The passenger man seldom has a chance to learn much about the handling of freight traffic, or the freight man about the handling of passenger traffic. The freight traffic of most American roads is much the more important. Consequently, when a traffic manager or vice-president in charge of traffic is to be chosen the ranking freight traffic officer usually is selected. In his higher position he is pretty sure to devote most of his fostering attention to his first and favorite child, the freight business. He is apt to underestimate the importance and possibilities of the passenger business. Perhaps this natural inattention of the higher traffic officers to the passenger business is the main reason why the managements of most steam roads overlooked the immense amount of latent local passenger business there was in the country until the electric lines came along and developed it, and also wrested from the steam roads a large part of their existing local business.

Similarly, in the operating department the mechanical and engineering officers seldom are given a chance to learn much about strictly transportation matters. Getting trains over the road is the main work of the operating department; all other

branches of its work are auxiliary. It naturally results that the transportation men usually are made superintendents, general managers and vice-presidents in charge of operation. But the transportation man usually knows no more about mechanical and engineering matters than the mechanical and engineering men do about transportation matters. He is apt, therefore, to not fully appreciate the need, as a means of getting trains over the road, of getting and keeping the track and rolling stock in the fittest condition or to know the best methods for doing this at the minimum cost. He is apt during periods of hard times—as was done on the many roads after the panic of 1907—to make cuts in the expenditures on track and rolling stock branches where they can least be borne, and will cause serious deterioration of the service given to the public and later increases in expenses out of all proportion to the savings temporarily effected.

The second need referred to—decentralization of management—grows in geometrical proportion to the increase in size of railway systems. No matter how able railway directors, chairman, presidents, vice-presidents, general managers and traffic managers, nature and perfected railway organization may unite in producing, there will always be a limit to the amount of business that these officers can expeditiously and efficiently transact; and the bigger railway systems grow the more matters they must, for the good of themselves, of the railways and of the public, leave to the final disposition of their subordinates. There are too many railway chairmen, presidents and vice-presidents in this country who are working themselves to death handling details which could and should be disposed of by general officers, or perhaps even by division officers. The main function of the higher officers is to think out and plan and direct what others are to do; and no man can do his best thinking and planning, not merely for to-day but for ten or twenty years ahead, when chronically burdened with the handling of a mass of current details. Excessive centralization seriously interferes with the establishment and maintenance of satisfactory and salutary relations between the railways and the public. Compelling the higher officers to immure themselves in their offices, it prevents them from coming in that frequent contact with the leaders of commerce and of public sentiment in their respective communities which is essential to enable them to get the public's point of view regarding railway affairs. When the people of a community ask for another local passenger train or switching track centralization of authority often makes it necessary for the division officers to refer the request to the general officers; for the general officers to refer it to the executive officers; and perhaps for the executive officers to refer it to the president, the president to the chairman, and the chairman to the board. If favorable action be finally taken the people of the community are incensed because it was not taken sooner. If unfavorable action be taken the people who have made the request, and who perhaps live somewhere in the Dakotas, or Kansas, or California, or Washington, feel that it is because the officers of the railways in Chicago or New York do not appreciate the deserts and needs, or care nothing about them, except to wring from them the maximum of money for the minimum of service. In many cases there are good grounds for the public's complaints. It is not possible for the chairman or directors of a railway, residing in New York or New England, to be familiar with local conditions in Kansas or Arizona, and the results would be much better if local officers were oftener allowed promptly to settle local matters.

It is the great merit of the unit system of organization which has been worked out by Major Hine and is being tried by Mr. Kruttschnitt in the operating and maintenance department of the Harriman Lines, that, if consistently applied, it will secure an early convergence of authority which will tend both to develop a larger number of board executives and to secure decentralization of railway management. It gives the transportation, mechanical and engineering men opportunity to learn something about each other's branches of work. Applied to the traffic department, it would give the freight and passenger men of every division and outside agency an opportunity to learn something about each other's work. Logically carried out, it would cause most purely divisional matters to be handled promptly and finally by division officers; most matters affecting only a single road in a system to be settled finally by the officers of that road, or by its ranking officer, whatever his title; and only matters of unusual importance affecting a single road and matters affecting the entire system to be handled by officers of the entire system. Of course, subordinate officers would, in each case, exercise their authority only in furtherance of a general policy laid down by their superiors, and would be held strictly responsible for the use or abuse of their enlarged discretion. Becoming experienced in assuming larger responsibility and exercising larger authority, they would be better fitted for promotion to higher positions; and the business of the road would be transacted with more despatch and efficiency, and more satisfaction to the public. No doubt there are many railway managers who question if Major Hine has struck the keynote of a more symmetrical and efficient railway organization. The experience of the Harriman Lines will throw light on this. That most railway organizations need to be substantially remodeled, especially those of large systems, and that Major Hine, under the direction of Mr. Kruttschnitt, is putting into effect a theory of first-rate importance, can hardly be seriously questioned.

NEW BOOKS.

Railway Signaling in Theory and Practice. By J. B. Latimer, Signal Engineer of the Chicago, Burlington & Quincy. Chicago: Mackenzie-Klink Publishing Co. 5 in. x 8 in.; 420 pages. Price, $2.50.

The title of this book is misleading; for one is led to expect an exhaustive treatise on the art of railway signaling, whereas, as a matter of fact, there is very little of theory or science in the book until the last chapter is reached. This chapter is by far the best part of the book, containing in brief form the opinions of the author on signaling in general. These opinions have been formed in the course of a long experience on the Burlington. Though his conclusions may seem reactionary, and though they are in a great measure opposed to the modern tendencies of the art, as exemplified in the doings of the Railway Signal Association, yet Mr. Latimer will find many sympathizers with his views. Moreover, many of these views have a good deal of force; as where he says that American railways would often do well to use a little money to get better men instead of spending large sums on machinery with a view to getting along with low grade men. But the questions on which Mr. Latimer differs with the majority of signal experts cannot be discussed in the brief space that he devotes to them, and what he says is, therefore, in effect, simply an announcement that he is an opposer. For a real discussion the reader must continue to wait. Finding no satisfactory constructive criticism, while yet finding some "reactionary" views which will repel him, the reader, seeking for knowledge, will find little satisfaction. All this, as we have intimated, refers to the last chapter of the book.

The first part of the book is taken up with detailed descriptions of the apparatus and mechanism of signaling, and, while full of detail, leaves much to be desired through lack of explanation of the reasons for providing the apparatus described, and of its actual use in service. Several chapters are prefaced by lists of some of the facts of electrical engineering, axiomatically stated, a feature which might better have been omitted. That part devoted to alternating current is vague. Many facts are also concealed in a maze of words, leaving the reader bewildered.

The illustrations are not well placed and the good ones are far too few in number. Too much is left to the reader's

imagination, especially in connection with circuits. The chapter on electric locking is particularly deficient; only one class is mentioned, and that is a class useful only at isolated plants. Again the description of indicating devices for power interlocking is separated by several chapters from the rest of the subject.

The book shows that it has been written by a master of mechanical interlocking and it is greatly to be regretted that it did not have the benefit of more careful editing.

Letters to the Editor.

RUN, REPAIR OR TRANSFER.

Cleveland, Ohio, Feb. 5, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

"Twentieth Century Inspection" or "Run, Repair or Transfer" no doubt will be under discussion at the next Master Car Builders' convention, and should be adopted as a rule of the association. It is as fair a proposition as any of the present rules. The question, it seems, is: "Who is to stand cost of transferring contents of cars?" This question is answered by the present M. C. B. rules. Car owner, delivering and receiving road, same as is done with cost of making repairs to cars at the present time, with a few exceptions. Car owner to pay when cars have failed under "fair usage," and when repairs cannot be made under load in a reasonable time. Delivering road to pay when car has been damaged by "unfair usage" or overload or improper load. The receiving road to pay when transferring is done to suit its requirements, or when car is in transit between interchange points, car owners to be held responsible for cost of transferring contents of cars when cars are interchanged on interchange points only. It is what is needed, and places the burden of cost where it properly belongs.

H. G. RANDE,
Newburgh & South Shore Ry.

COST OF SERVICE AND THE ALTON CASE.

New York, Feb. 16, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Only to-day has my attention been called to your reference to my remarks at the recent dinner of the New York Economic Club concerning the Chicago & Alton transaction, in which, without intended unkindness, though in error, you remark that I defended it on almost the only ground which was indefensible, namely, the moral ground.

As to the Alton transaction, I was careful to state, in answer to an inquiry from the floor, that I had no information as to the conditions of the transaction, and I distinctly declined to express any opinion as to the moral quality of transactions as to which I was not fully informed. I did, however, ask certain questions, namely:

1. Were the rates on the Alton before its reorganization less than those of the roads with which it was in competition?

2. Were the rates after reorganization higher than before, or higher than those of the roads with which it was in competition?

3. Had the new securities failed to pay their interest and dividends, or had they declined in value?

I stated that I was not qualified to answer any of these questions and yet an affirmative answer to each question was necessary to determine whether or not the transaction had injured the public, either as purchasers of transportation or as purchasers of securities. So far as I can observe, this is exactly your own contention, and, as to the Alton transaction, I made no other comment or contention.

But, as to the Louisville & Nashville transaction, I did state that I had knowledge, and that at least so far as concerned my clients I was prepared to sustain the proceedings, fully disclosed in the winter of 1903 before the Interstate Commerce Commission, which never yet has formally passed thereon, though an important member of the commission personally advised me that, so far as my clients were concerned, the transaction was not only legally, but morally, right; a view which does not seem to be inconsistent with the position taken in the fourth paragraph of your article.

Finally, I made a declaration essentially the same as that well put in the fifth paragraph of your article, namely, that the principal ground for just objection to so-called over-capitalization is its injurious effect on the financial credit of the corporation, constituting a waste of corporate assets and deprivation of corporate ability thereafter to obtain new funds upon reasonable terms for actual capital requirements.

Indeed, your summary presentation of the general principles of railway capitalization is so sound that I regret that this communication, instead of being an unqualified endorsement of your article, is modified because of my wish (perhaps not unnatural) not to be held responsible for an opinion which I did not express and have not formed.

FRANCIS LYNDE STETSON.

TRAIN RESISTANCE ON THE VIRGINIAN RAILWAY.

Iowa City, Iowa, Feb. 19, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The recent accounts of heavy trains hauled on the Virginian Railway suggest an interesting question as to train resistance. The train authoritatively mentioned in your issue of October 22 weighed 7,562 tons behind the tender, and the locomotive weighed about 213 tons, making a total of 7,775 tons. Mr. Sanderson says that the adverse grades were too long to be considered momentum grades, and I understand that they are 2/10 of 1 per cent. If they are handled as straight ruling grade, we cannot get away from 4 lbs. per ton grade resistance, or 31,100 lbs. for the train. The engine had 207,450 lbs. on the drivers and in ordinary service it would not exert more than ¼ of this weight as tractive effort; but whether it did or not is also an interesting question. One-fourth the weight on the drivers is 51,852 less the 31,100 for grade resistance leaves 20,762 for train resistance—but a trifle under 2.7 lbs. per ton, at an average speed of something like 14 miles an hour. This is certainly much less than anybody would think of suggesting, and I wonder whether it is correct, or whether the tractive effort was more than ¼ the weight on the drivers, or if the grades were in point of fact momentum grades.

But the later account of a train carrying 6,000 tons of coal in 120 cars is still more astonishing. Adding the caboose and the locomotive and assuming the cars to weigh the same as in the regular train, the total appears to be about 8,683 tons. The grade resistance for this train would be 34,732 lbs., which subtracted from the 51,862 lbs. of tractive effort leaves 17,730 for train resistance, or but a trifle over 2 lbs. per ton. Can this be, and if not what is the explanation?

WILLIAM G. RAYMOND,
Dean of the College of Applied Science, State University of Iowa.

LIMITED SPEED OF PASSENGER LOCOMOTIVES.

Philadelphia, Jan. 12, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I firmly believe that in order to improve the high speed performance of locomotives it is necessary for someone to devise a valve gear which will give a Corliss steam distribution without troublesome complication so that clearance spaces can be reduced. This would result in a larger percentage of the total cylinder volume being made effective. There is now pending at Washington an application for letters patent to cover the result of the writer's earnest study of the problem, which he hopes will prove to be the correct solution. C. M.

Mendenhall, formerly of the Philadelphia, Baltimore & Washington, has looked over the drawings and expressed himself as well satisfied that the device is worthy of a trial. It is very simple and is not thought to contain any element which would prove objectionable in locomotive service.

The letter of F. W. Dean was of considerable interest to the writer as he is quite familiar with the Strong device which Mr. Dean mentions, having handled one of the engines on a line of the Atchison, Topeka & Santa Fe Railway some years ago. I cannot agree with Mr. Dean's suggestion to use what would practically be two sets of valve gear on a locomotive, with separate valves for admission and exhaust and two reverse levers, as it is a well known fact that enginemen are very much averse to any device which will increase their labors. In fact, the writer has known of cases where the introduction of innovations has nearly resulted in labor trouble. For the above reason, if there were no other, we should stick to simplicity in our efforts to keep the steam locomotive at the head of the railway procession, where the writer thinks it justly belongs, excepting, perhaps, in some cases where it is necessary to use electricity to avoid nuisance. Again there is the objection that the arrangement of four valves at the top of a steam cylinder with their connecting ports would involve clearance spaces larger than are desirable from the standpoint of economy, as well as the fact that there would of necessity be a large number of joints to develop lost motion, which would be a serious drawback.

I propose to accomplish all which could be done in the way of improved steam distribution, with a single flat valve and a very simple attachment, by means of which, the events of an ordinary valve motion can be so altered that a very much reduced clearance space could be consistently used. In addition to the improved events, the port opening would be augmented for admission by 29 per cent. over the opening given by any of the usual gears, when working at short cut-offs and the opening for exhaust at the center of the stroke, where the piston speed is at its maximum, would be at least 75 per cent. greater than with the usual gears. I am of the opinion that were the device of which he writes tried out in service it would be found that a very great stride had been made.

The instances cited by H. W. Taylor of the Reading are merely the result of largely augmented power with present methods, and not due to any improved form of mechanism. We can achieve fully as good results with much lighter engines if we improve our methods and thereby get better performance by decreasing the internal resistance.

I am thoroughly in accord with you in the belief that modern locomotives have not kept pace with modern requirements, and I believe that the near future will bring some valuable improvements.

CHAS. F. PRESCOTT.

WAGES, EFFICIENCY AND BROTHERHOODS.

Chicago, Ill., Feb. 4, 1910.

To the Editor of the Railway Age Gazette:

The rather general demand on the part of certain branches of the railway service, namely, the enginemen, trainmen, switchmen and telegraph operators, for increased pay has attracted the notice of the public to a considerable degree. It has also developed a considerable spirit of inquiry among the scattered, smaller holders of railway securities and the rank and file of railway employees in other branches of the service as to the extent to which the demands are justified. There is a widespread and growing belief on the part of the latter that railway managers have not given a due regard to the scales of justice in their wage dealings with the employees of all departments, and that organized employees have been unduly, and unnecessarily, favored at the expense of the others.

The causes that may have led to such discrimination, if it exists, have been variously ascribed. A strike, real or impending, has a depressing effect on the stock market, and it is an indubitable fact that in the past the operating head who launched into a serious conflict with any of the larger orders has usually "killed" himself. The courage of right against self-interest is vouchsafed to but a few men, hence one of the causes may be the lack of that courage. Another one of the ascribed causes in the West is that the line officers; that is, the trainmasters, superintendents and sometimes general superintendents, having risen from the ranks of one or the other of the orders, have retained their former affiliations, and thereby have been influenced to a course not compatible with the best interests of all employees of the service nor of the stockholders. Granting this to be a fact, it would go a long way to explain the growing irreverence for governing rules, and the decreasing force of discipline. Employees, or aggregations of employees, who can rely more on power than merit to enforce their own terms, will lose in respect for their employers, and employees who feel that merit not allied with power is inadequate to secure consideration will deteriorate in loyalty.

However, let us waive matters that are largely speculative, and hence may be the subject of dispute. In a desire to ascertain to what extent, if any, there has been an uneven distribution in the increase of wages in the different branches of the railway service, the relative increase in efficiency, and the relating increase in cost of living which equally affects all, I was led to compile the following tables:

Table 1.—*Classified Comparison of Number of Railway Employees for 1893 and 1907, and Per Cent. of Increase.*

	1893.	1907.	Per cent. of increase.
Station agents	28,019	36,549	20
Other station men	75,181	152,929	103
Telegraph operators and despatchers.	22,619	39,193	73
Section foremen	29,699	41,391	40
Other trackmen	180,154	367,277	104
General office clerks	27,584	65,700	138
Engineers	38,781	65,298	68
Firemen	40,359	69,384	72
Conductors	27,537	48,869	77
Other trainmen	72,959	134,257	84
All other employees and laborers*...	324,100	638,171	97
Total	866,992	1,658,118	91

* Officers excluded.

Table 2.—*Relative Number of Classes of Employees per 100,000,000 Tons Carried One Mile (Passengers carried one mile reduced to tons one mile on basis of one passenger one mile. Two tons one mile).*

	1893.	1907.	Per cent. of increase in efficiency.
Station agents	23	12	92
Other station men	62	52	19
Telegraph operators and despatchers.	19	13	46
Section foremen	25	14	79
Other trackmen	150	125	20
General Office Clerks	23	22	5
Engineers	32	22	45
Firemen	34	24	42
Conductors	23	17	35
Other trainmen	61	46	33
All other employees and laborers.*...	269	218	23
Total	720	564	28

* Officers excluded.

Table 3.—*Classified Comparison of Wages Per Day of Railway Employees for 1893 and 1907, and Per Cent. of Increase.*

	1893.	1907.	Per cent. of Increase.
Station agents	$1.83	$2.05	12
Other station men	1.65	1.78	8
Telegraph operators and despatchers..	1.96	2.26	15
Section foremen	1.75	1.90	9
Other trackmen	1.22	1.46	20
General office clerks	2.25	2.30	2
Engineers	3.68	4 30	17
Firemen	2.06	2.54	23
Conductors	3.10	3.69	19
Other trainmen	1.92	2.54	32
All other employees and laborers.*...	1.84	2.10	14

* Officers excluded.

Table 4.—*Relative Retail Price of the Principal Articles of Food—Per Cent. of Base or Standard Price Selected by Bureau of Labor.*

	1893.	1907.	Per cent. of increase.
Beef, fresh	99.6	120.6	21.0
Bread	100.1	104.5	4.4
Butter	109.9	127.6	17.7
Eggs	108.1	137.7	29.6
Flour	96.1	117.7	21.6
Pork, fresh	107.0	142.5	35.5
Potatoes	112.3	120.6	8.3
Sugar	101.5	99.6	1.9
Coffee	104.8	95.0	9.8
All food			15.5

The accuracy of the foregoing figures can be readily established by reference to the *Statistical Abstract of the United States* for 1908. The two years selected, viz., 1893 and 1907, are peculiarly suited to a comparison on account of the analogy of traffic conditions which prevailed during both of these years. In 1893, the railways handled a greater volume of traffic and paid more in dividends than in any previous year or in any of the next four or five succeeding years. The conditions of 1907 are still well remembered.

With respect to the comparison as to efficiency, the enactment of the Hepburn Bill has somewhat influenced the result for certain classes. This appears most clearly in the general office clerks, the number of which was greatly increased in the traffic and acounting departments in order to comply with the new requirements. The increase in efficiency of engineers and firemen is due largely to an actual increase in service rendered. The more powerful engines hauling longer trains and the extension of block and signal systems have added much to the responsibility and required vigilance of the engineer and to the labor of the fireman. On the former, more than perhaps the rest of the entire train crew, depends the safety of the train. On the other hand, as the block and signal systems and air brakes have placed more responsibility on the engineer, the burden of the conductors and brakemen has been correspondingly lightened. In addition, where roads have found it expedient to place on trains collectors or auditors to handle transportation, the conductors have been relieved of that duty.

Bearing these conditions in mind, the comparisons lead to the following deductions:

That the increase in wages of the classes of railway employees now demanding higher wages has kept pace with the increase in cost of living.

That the increase in wages of conductors and other trainmen has been greater than that accorded to any class of employees in the service, and is excessive if relatively considered with respect to increase in efficiency.

That, viewed from a standpoint of rights only, it does not appear that operating managers can consistently accede to the demands of the classes of organized employees who are seeking higher wages unless prepared to grant a substantial increase to those classes of employees not members of orders who in the past have not been favored equally with organized employees.

That the stockholders that is, the actual owners of the properties in conservation of their own interests, must require at the hands of their operating officers equitable treatment for all classes of their employees in order to secure the co-operation and good will of all necessary to profitable railway operation in future.

X. Y. Z.

Contributed Papers.

THE VARIABLE PER DIEM RATE.

The announcement made by Mr. Allen, general secretary of the American Railway Association, that the letter ballot on the per diem rate has resulted in favor of the adoption of a variable rate, gains interest from the accompanying extracts from various reports, which would seem to show that the idea of variable per diem originated in this country with Mr. Daly of the Illinois Central Railroad in the year 1906; and it appears to be certain that Mr. Daly gave that idea to Mr. Lane of the Interstate Commerce Commission.

It will be remembered that in 1906 there was a very considerable car shortage. The original rate of 20 cents per day was changed to 25 cents by letter ballot, taken in the early part of 1906, and the rate of 25 cents went into effect on July 1 of that year. The car shortage was such that this rate became very unsatisfactory, and the demand for cars resulted in a demand for very high rates of per diem—some of the rates named being enough to consume the whole net earnings of the car. The 50-cent rate, which was adopted by some roads in December, 1906, and by the rest of the roads on July 1, 1907, seems high now, but it was thought very moderate at the time when it was adopted.

If anything like the car shortage of 1906-7 recurs there will probably be another demand for a very high per diem rate. It is hoped that the principle of "variable per diem" having been established, the high rate can be confined to the months when it is needed.

Mr. Allen's note on car interchange and demurrage, published in the last bulletin of the International Railway Congress, shows that a variable per diem rate is in effect between two French railways—the Southern Railway and the Orleans Railway.

Between these roads the high rate applies for only four months of the year and is nearly a dollar per day. For the other eight months the rate is less than 20 cents per day.

Extract from proceedings of meeting of the Association of Transportation and Car Accounting Officers, held in May, 1906.

J. M. Daly of the Illinois Central Railroad, in a discussion of the report presented by the association's committee on car service, said in part:

"The remedy to apply and which will protect the car owner in enjoying the use of his car during the busy season is to raise your per diem rates to a point where they will compensate the owner for his equipment during the busy season, for which period it was constructed. The thought was discussed this way: Why could not the American Railway Association set a date that would strike the beginning of the busy season for railways throughout the country, on which date the rate per day per car would be increased?

"When the business gets dull then you drop down to 20 cents a day in order to prevent the necessity for transferring cars to avoid settling on the high basis. The result of that would be that the railways that have been living on other companies' equipment and doing business during the busy months with cars against the owners' wishes, giving them no return traffic in the cars, would find it to their advantage to build equipment to take care of themselves during the busy season, and if everybody does that then you have free interchange of cars."

Extract from minutes of the hearing in Chicago, Dec. 20-21, 1906, of the Interstate Commerce Commission, in the matter of car shortage.

Commissioner Lane: "Suppose you adopted some such plan as this—that during the last six months of the year you raised the per diem rate to $1.25?"

Mr. Daly: "That is a very proper suggestion, and it is one that I worked out in committee at Denver at the last meeting. That is, I believe there should be two rates, for two reasons; one is, because the road that builds cars for the busy season should be protected in the busy season with them.

"I do not want to advocate $1 per day the year around, for the reason that that would be sufficiently high to act as an incentive to the receiving roads in the dull season to stop a commodity in transit and transfer the contents into their car, thereby delaying shipments and congesting terminals, and where there is such a shortage of labor it would make it even still shorter.

"We, in turn, when the foreign car is delivered to us, would transfer its contents into an empty that we would have there, and that would be burning up money for no good. But, if the rate were 50 cents per day for the six dull months and a dollar a day for the six months of business, then it strikes me that you are meeting the proposition on a business basis, from a business man's standpoint and in a proper manner."

Extract from report of the Interstate Commerce Commission in December, 1906, in the matter of car shortage.

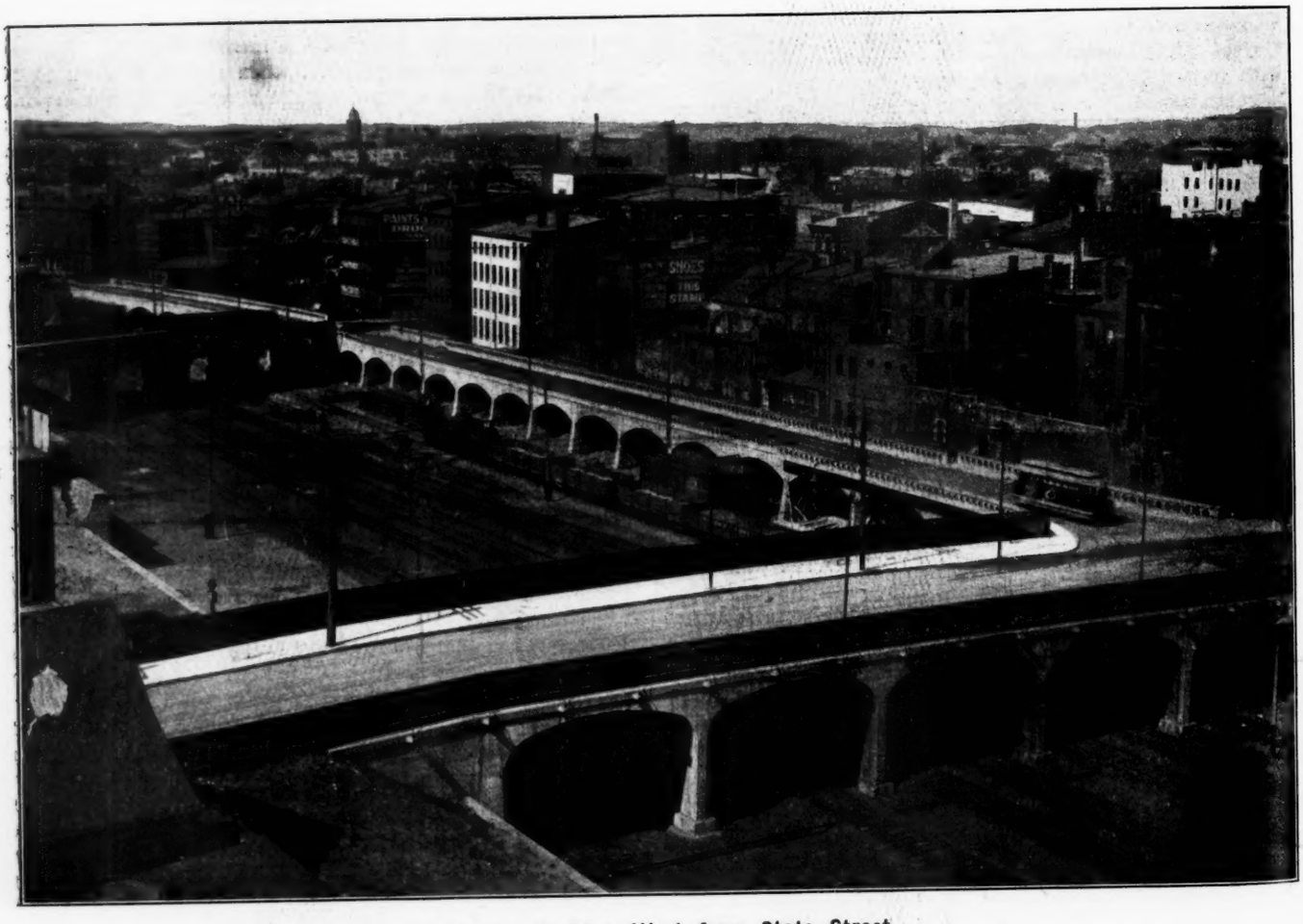
Commissioner Lane said in part:

"A rule might be adopted fixing a minimum of 50 cents per day during those months of the year when traffic is light, and increasing this possibly fourfold during the latter half of the year when cars are most needed."

CONCRETE VIADUCT AT NEW HAVEN.

The accompanying photographs show a concrete viaduct recently built by the New York, New Haven & Hartford at New Haven. It runs from Chapel street, which is east of the station, about a quarter of a mile parallel with the steam railway tracks to a point near the New Haven station. It is

Street Railway Viaduct at New Haven.



Viaduct, Looking West from State Street.

built to carry the street cars which formerly ran from Chapel street to the station via State street, which is parallel to the tracks and a block or two north of them. This was done to relieve the congestion of State street, which carries heavy vehicular traffic. As shown in one of the photographs, the structure allows access of abutting property owners to service tracks for loading cars.

MAKING A RAILWAY REPORT.

BY CHARLES F. SPEARE.

Only about one-hundredth part of the available data laid before the president and the general manager of a railway concerning the financial operations, the transportation and traffic features and the physical changes of their road during the year find a place in the annual report. As this is the season when railway stockholders are trying to size up their respective properties and their managements from the mass of statistics contained in the usual annual exhibit, it may be of value to indicate the lines on which reports might be built to provide shareholders with a knowledge of their plant, and also to specify some of the best features already existing and those which companies that do not present them may well copy.

First of all, a railway report should contain a good map of the territory served by the line and the country tributary to it in a traffic sense. This will immediately permit the stockholder to visualize the most important physical aspect of his property, viz.: its geographical position. Where a road is a part of a general system, as in the case of the Burlington, or the Missouri Pacific, or the Chesapeake & Ohio, or the Big Four, to go no further, a map showing its family alliances ought to be presented, as this will clearly indicate the value, or lack of it, of this member of the system to other parts of it, and their place as feeders or links in a continuous chain joining one section of the country to another. As an attachment to the map a condensed profile would serve to illustrate the main physical features of the line.

Mileage in different states, if a road is an interstate proposition, is essential as a part of a report. Wherever expansion has been in progress it is valuable for a management to indicate to stockholders the sections of greatest mileage increase, for in this way it can readily be ascertained whether the traffic of the new territory will pay for the expense of building new lines or whether new capital advanced against this mileage is to be productive within a reasonable time. Having a map and a division of mileage by states the geography of a system becomes established in the shareholder's mind, assuming that he has not taken the trouble to personally inspect the property. Now he is ready to look into the more intimate physical features which the road presents.

Here we enter a rather barren field. Only a very few railways include in their report the primary physical features, such as grades and curvature. These are to be found in reports of the Delaware & Hudson, Chicago & Alton and the Texas & Pacific. By itself such a description might, perhaps, have little value to the average stockholder, but relative to a table of similar sort giving changes over a period of years, it would be one of the most informing of features in this day of intensive railroading when the demand is for as straight track and as low grade as possible and a road is measured among its competitors, and by bankers who are called upon to finance it, by the work it is doing and has done to lower its cost of transportation. Akin to this is the need of a very clear and a comparative statement of weight of rail, character and mileage of ballast, miles of stone or steel bridges in contrast to wooden structures and miles of trestle work. Fortunately, most railways give a great deal of this information. Those that do not are cheating their stockholders of facts that are absolutely essential to the knowledge of the physical character of a road, not only as it stands to-day, but as a measure of how far it has progressed or stood still. While many railways indicate the number of tons of certain weight rail laid down in a year or the number of miles of ballast spread, they do not show the percentage of light to heavy rail in past years compared with the percentage to-day, or the number of miles of unballasted line compared with that in ballast now. This is most important. It could easily be given and would be of immense significance to owners of the road. Equally important are tables showing the yearly changes from wooden bridges to bridges of permanent type and the number of miles of road where permanent fills have replaced trestle work. Several of the Gould lines set this information out in very good shape. It would seem as though data of this sort might more properly be given than so much detail about trivial expenditures which play no part in the larger development and efficiency of a property and which occupy such a great amount of space in the average report of to-day.

Modern railroading has been reduced to a small number of efficiency standards. We want first to show if a road is strong, what are its grades and curves and then the sort of equipment it possesses and the condition and capacity of that equipment. Until a road is built on a firm foundation it is useless to provide it with 100 and 150-ton engines and 40 and 50-ton cars. But, given a road that will stand the test of the new standards of equipment, there is really no limit* to what can be built or driven or hauled in the way of engines and cars and maximum weight units and tractive power play one of the leading parts in the successful railway of the twentieth century. Naturally, therefore, a stockholder should find in the report directed to him each year a concise statement of the size and capacity of his cars and the weight and tractive power of his engines and the relation they bear now to the road's equipment in other years. This feature is almost fundamental in any report worth while in these days, as so much depends on equipment to produce satisfactory net earnings. It is one of the first statements that a road that is doing good work in this direction ought to set forth and the last that another road that is backward should, for policy's sake, expose. The New York, Ontario & Western makes a great feature of this, going back for a period of 20 years. This is hardly necessary, as the transaction from light or moderate to heavy power only dates from ten or a dozen years ago. The Atchison and, more particularly, the Harriman roads indicate in a way that shows their pride in what they have done the record of the company in this particular direction. It is unfortunate that roads like the Great Northern and Northern Pacific in the West, and the Chesapeake & Ohio and the Norfolk & Western in the East, have not given attention to this field, for they have obtained such plendid tonnage results by means of their greatly increased power and car capacity.

Where a road is extending its facilities in the way of second or third track and sidings it is very important that this be indicated, as it is one of the most direct means of reducing the cost of moving traffic after a line has reached about maximum as a one-track proposition.

Having given the leading physical features of a railway, the stockholder naturally turns to that part of his report which deals with the tonnage classification. It is surprising to find in so complete and well-ordered a report as that of the Union Pacific an absence of this most informing feature. Neither do the Hill roads contain it, to their discredit, while the companies that abbreviate the classification to so much percentage of merchandise, or coal, or agricultural products greatly limit the field of resource of the investigator into the means of a road's revenues. There is all the difference between permanent success and occasional success in a road that has traffic of one character. A stock or bondholder, therefore, ought to be able to know just what his road is carrying. Furthermore, it is well to indicate, from year to year, the changes in the character of traffic. This the Delaware & Hudson does most

*Except that arising from the relation of line clearances to boiler and cylinder capacity.—EDITOR.

admirably, and its tables, which are unique, give at a glance a splendid picture of the traffic progress of that system over a 10-year period. The trend of traffic is also of great value in measuring the earning power of a railway, and certainly the relation between loaded and empty car mileage ought never to be omitted from a report. Where managers fail to give it stockholders should demand that it be inserted, as it is one of the best checks to inefficient administration. The percentage of local to through traffic and the average length of haul are requisites.

In dealing with betterments and improvements and work charged to income or to capital account, the tendency is to err either on the side of scanty information or profuseness. For instance, the 1909 report of the Baltimore & Ohio occupies 10 pages, with a detailed description of every major and minor bit of work done with the aggregate cost under $5,000,000, while the report of the Union Pacific sums up work that costs nearly twice as much in the space of one page. It has been found that roads that give a great deal of space to this feature are very deficient in other equally suggestive statements, notably the Hill lines and the Missouri Pacific. The Chicago & Alton rounds out its report in about the best manner of any of those that treat different departments in a detailed fashion.

We come now to features of a railway report that deal directly with costs. Here the stockholder enters a somewhat technical field. The majority will probably need a guide to steer a straight course through the mazes of ton mileage, ton mile cost, revenue mileage and the details involved in the reduction of cost of repairs, labor, lubricants, etc., to exact unit measurements. These are absolutely essential and fortunately, American railways, for the most part, set out this information in liberal style. The main advantage that it offers to the layman is as a basis of comparison of results one year with those of the preceding year or some year further back from which it is desirable to obtain a proper perspective of a railway's management. The greatest use of this sort of data is to railway men themselves, in comparing their work with that of men on other lines and gaining a certain standard of efficiency or a fixed ideal of operation. The difference in units of measurements are so abrupt, as from billions of ton miles to the separation of revenues per ton per mile into units of a mile, that the ordinary man cannot grasp their meaning and flounders in a mass of unintelligible statistics.

As a railway is, first of all, a physical organization, and secondly, a machine whose work it is to move freight and passengers, the chief things to be known of it bear on the two matters of physical condition and transportation ability. However, the railway has certain marked financial aspects without a knowledge of which no estimate could be placed on the value of its securities, even were all to be known about its condition and its traffic. Railway reports might almost be divided into those that feature the financial side of the company and those that bring forward most conspicuously the physical and operating characteristics. Companies like the Pennsylvania Railroad and the Union Pacific, which possess enormous equities in the shape of securities of other lines, and whose income from investments is no less important than that from operations, most naturally deal in great detail with financial accounts. For the average railway, however, a complete balance sheet, not too much confused by entries that have no bearing on the main question of assets and liabilities, a table of funded debt and interest charges, the leases and rentals contracted or guaranteed, holdings of stocks or bonds of controlled companies, and, above all, a description of each separate mortgage, covers the ground. Few reports now contain this last-named feature, but where it is given, as in the case of the roads of the Rock Island system, it indicates a true conception of what security-holders ought to possess. Naturally, an income account is to be looked for in every report, but unfortunately many roads do not take the trouble to place one year's figures in contrast to those of the previous year, so it is difficult to immediately determine the results covering the 12 months.

These seem to me to be the leading points toward which the compiler of an informing railway report should direct his attention, and for which the stockholder should look in forming a basis of information of his company's doings. Railway reports can be too verbose. There is before me a report of the International & Great Northern, covering 135 pages, which would require a week's time to analyze thoroughly. This, however, is compiled by the receiver for a special purpose and does not represent the normal plan of the report. The number of stockholders in American railways is increasing rapidly from year to year, and as control of these properties is reduced to smaller units of ownership, it is more necessary than ever that presidents and general managers and comptrollers, in arranging their yearly statements, should cover thoroughly the field of their endeavors and leave no important result and the manner of its making or any new policy and its effect out of his annual statement to the real owners of the property.

RAILWAY MAIL PAY.

Julius Kruttschnitt, Lucius Tuttle, Ralph Peters, C. A. Wickersham and W. W. Baldwin, constituting a committee appointed at a meeting of railway officers held in Chicago, have issued a circular giving numerous facts about the compensation received by the railways from the government for carrying the mails, tending to show the unreasonableness (and absurdity) of claims which have been published to the effect that the deficit in the post office department for the past year was due to excessive sums paid to the railways. This committee represents 139 railways, operating 193,000 miles of lines. Readers of the *Railway Age Gazette* will recognize the members as officers respectively of the Union-Southern Pacific, the Boston & Maine, the Long Island, the Atlanta & West Point and the Burlington. The circular, in substance, follows:

RAILWAY MAIL PAY AND THE POSTAL DEFICIT.

Recent Acts of Congress and orders of the Department having the force of Law, have reduced the compensation, though pronounced not excessive by Congressional committees, by the following amounts:

1. The Act of Congress March 2, 1907, reduced pay on all routes moving more than 5,000 lbs. a day and also reduced the rates for furnishing and hauling railway post office cars. The effect of this Act was a loss of $2,676,468 annually, or 6 per cent. of the total received for both classes of service.

2. Act of Congress June 26, 1906, withdrew from the tonnage of mails on which pay was allowed empty mail bags and certain supplies thereafter to be shipped by freight or express. The effect was to cut a million dollars annually from the pay of the railways with no reduction of space facilities required to be furnished.

3. Postmaster-General's order of June 3, 1907, changed the methods of computing average weights, resulting in reduction of $4,500,000 per annum, or nearly 10 per cent.

4. Postmaster-General's orders further reduced railway postal car pay, causing reduction in annual pay to the railways of $345,287.

All of these reductions, aggregating $8,500,000 per annum, or 17 per cent. of the total railway mail pay for the year ending June 30, 1909, were made in the face of large increases in the cost of labor and materials.

The message of the President of December 7, 1909, on second class mail matter has inspired those enjoying these very low rates to try to show that the deficit is due to improvident railway mail pay contracts, rental and haul of railway post office cars, and to grossly discriminatory rates in comparison with those paid by express companies.

HANDLING SECOND CLASS MAIL MATTER.

In 1907 the postal deficit was $6,653,283. In 1909 it was

$17,441,719, an increase of 162 per cent. During the same period the postal revenues increased $19,977,378, from $183,585,005, to $203,562,383, or 19 per cent., and as tonnage of second class mail was practically the same the deficit was due to other causes than increase in second class mail. The pay to the railways was the same in both years, although the ton miles of service increased 14 per cent. The total increase of expenses in 1909 over 1907 was $30,765,814. Only about ¼ of 1 per cent. of this went to the railways. As neither tonnage of second class mail nor railway mail pay increased, we must search elsewhere for the causes of the increased deficit from $6,600,000 to $17,400,000; or, put in another way, why it cost the Department $30,765,814 in increased expenses to earn $19,977,378 more revenue.

A study of the revenues and expenditures of the Post Office Department, by classes of mail handled, in 1909, as shown in the Postmaster-General's report, shows that on first class mail the government received a revenue of 84 cents a lb. The total expense of handling was 49.92 cents, of which 5.56 cents or only 11 per cent. was paid to the railways and 89 per cent. for other expenses. On second class mail the total expense per pound was 9.23 cents, of which 3.19 cents or 34 per cent. was paid to the railways and 66 per cent. for all other expenses. In the case of the first class mail matter the government pays the railways 6.6 per cent. of the gross earnings for handling, in the case of the second class mail 290 per cent. of the gross earnings. Newspapers and magazines have claimed with much force and justice that, while the government may distribute them at a loss, they stimulate so much letter writing that the carriage of the first and second class matter should be considered as joint and not a separate traffic. Consolidating the first and second class, the total revenue becomes 14.88 cents per pound and total expenditures 15.98 cents per pound, of which 3.22 cents is paid the railways and 12.76 cents for other expenses. The railway pay is 20 per cent. of the total cost and rural delivery 19 per cent. The free Departmental and Congressional mail, if charged for at the same rate as the combined first and second class matter, would add $7,086,385 to the revenue of the Department, with which it should justly be credited.

The figures of the Postmaster-General's report of 1909, pages 29 and 58, show that the actual amount paid for transporting second class matter by railways (including post office car pay) is only 3.19 cents per pound of mail matter, *excluding weight of mail equipment also carried by railways* under the same preferential and discriminatory service accorded the mail itself. The universally misquoted rate of 9.23 cents per pound covers *all of the cost of handling mail, including rural delivery, administration expenses, etc.* (page 32). As the government requires the railways to carry ⅓ of a pound of equipment with every pound of mail, the real rate of 3.19 cents computed on mail alone is equal to 1.9 cents per pound of weight carried.

The apportionment of expenses to second class matter by the Department is open to criticism as of the total loss claimed from this matter nearly $14,000,000 is attributed to rural delivery, which the magazines claim is not required by them, and $7,000,000 for salaries of railway postal clerks and car pay, while the amount charged for transportation is too high, for if this matter were removed from the mails the railway pay per ton mile would become higher while postal car service could be only slightly reduced. Again, the cost of "Free in County" delivery of a large tonnage of newspapers is charged against the paying tonnage, while if the expenses were apportioned on basis of weight of mail and equipment instead of mail only the charge against second class matter would be largely reduced.

IMPROVIDENT RAILWAY MAIL CONTRACTS.

It is the popular impression that the compensation paid the railways for railway post office cars is a rental simply. Nothing could be more erroneous. The pay covers not only the exclusive use—a very small part indeed of the expense to the carrier—but the very burdensome and expensive duty of hauling the car—a fully equipped post office on wheels—in fast passenger trains in which mail is assorted and distributed en route by a corps of clerks to expedite its delivery at intermediate points and terminals. These cars are hauled in trains, next to baggage cars [which baggage cars have] ample cubic capacity to carry all mail tendered, and to earn all transportation charges prescribed by law, but for public convenience the Department provides these moving post offices, weighing 12.4 per cent. of the average passenger train. For the use and cost of hauling this car ridiculously inadequate railway post office pay is allowed.

For a 60-foot railway postal car the carriers receive 5.5 cents per mile hauled, according to the scheduled railway post office car rates. These cars weigh about 50 tons, so the average earning per gross ton mile hauled is 1.1 mills. The Department on many lines uses the car one way only forcing the carriers to haul it back empty, so that on such lines the car mile earning would be reduced to 2.8 cents or about the same earnings per mile as from 1½ first-class passengers, and the ton mile earning to 6-10 of a mill. From published railway tariffs we find that for hauling empty passenger cars, which weigh much less, the railways receive 11 cents a car mile, or 2.4 mills a ton mile; that to haul empty baggage, express and mail cars in passenger trains they receive 8 cents to 15 cents a car mile or from 2.2 mills to 4.2 mills per ton mile—twice to four times as much as they receive from the government. *To move empty freight cars in freight trains carriers receive more than they receive for moving postal cars in passenger trains*, and when the revenue accruing from moving loaded freight cars in freight trains is considered the disparity becomes almost incredible.

The average haul of second-class mail matter (Report of 1907 Special Weighing of the Mails, page 58) is 610 miles, the average rate paid the railways for transporting a pound of this matter, including railway postal car pay, is 3.19 cents, and for transportation of mails and packages containing it (to make it comparable with express) 1.83 cents per pound, or 6 cents per ton mile. The merchandise express rates from Chicago to points named below are as follows for contents and packages:

Chicago to	Distance, miles.	Rate per 100 lbs.	Rate per ton miles.	55% paid railroads.
Marshalltown, Iowa	280	$1.75	12.5 cts.	6.87 cts.
Cincinnati, Ohio.....	285	1.50	10.5 "	5.77 "
Omaha, Neb.	491	2.00	8.1 "	4.45 "
Grand Island, Neb.....	645	3.25	10.1 "	5.55 "
New York, N. Y.....	907	2.50	5.5 "	3.02 "
San Francisco, Cal.....	2,267	11.50	10.1 "	5.55 "

On short hauls express rates are lower than second-class postal rates because postal rates are made regardless of distance, while express rates take account of distance carried. Therefore, for long distances express rates are much higher, and the only fair comparison that can be made is one based on average hauls.

Considering the conditions and reciprocal obligations, express is far more attractive and remunerative than mail traffic and would be so though the ton mile earnings from express were far less. Bearing in mind that economical train operation means good car loading and good train loading, express is handled with baggage in cars loaded to full capacity; mail requires a post office on wheels with space for mail racks and postal clerks working en route, loaded with an average of but two tons, or one-seventh full weight capacity. The design and specifications of the post office car are made by the Department regardless of expense, as the carrier pays, and, therefore, because of its special fittings for post office use is much more costly to build, equip, maintain and haul in trains, as its dead weight is 50 per cent. greater than baggage and express cars. On the other hand, it brings in less revenue as its net carrying capacity for mail is not more than 2½ tons, while express cars, having no space taken up with special fittings and equipment, can be loaded to 15 or 20 tons. Mails are handled on the fastest trains, often compromising their schedules, and special expenses are imposed on the carriers to transfer at junctions, handle free at terminals and into intermediate stations, fines and deductions are made for delay,

etc., all of which are charges against gross mail revenue. In the case of express the carriers' compensation is increased by services rendered by express companies, such as free carriage of remittances and packages, express messengers acting as baggagemen, joint station agents and employees, etc.

Under existing contracts the carriers are paid from 50 per cent. to 55 per cent. of the gross earnings of express companies for the transportation service rendered by the carriers. If the railways were to offer the Post Office Department the more favorable contracts which it is thought the express companies enjoy, the railways would expect say 50 per cent. of the gross earnings of the Department and their pay from all sources for the carriage of mail would be raised from $49,700,000 to over $102,000,000. Express companies pay the railways 50 per cent. to 55 per cent. of their gross earnings for transportation; the Department pays only 24 per cent. The Department retains 76 per cent. of its gross earnings and shows a large deficit yearly; the express companies retain 45 per cent. of theirs and after paying all expenses of collecting, delivering, messenger hire, etc., pay handsome dividends to their stockholders. The Post Office Department conducts its traffic regardless of all well-founded principles of economy—and very properly so—solely for public convenience, and the beneficiary should expect to foot reasonable bills for the service. The express companies are required by the carriers to handle their traffic with strict regard to economy.

Any comparison of mail with express or freight rates is valueless unless all conditions are considered and valued, such as average haul, character and flexibility of contracts and of service rendered. The higher ton mile rate may when modified by conditions be the less remunerative to the carrier. On the average passenger train carrying mail, express and passengers, 12.4 per cent. of the weight of the train is devoted to post office features not needed by the carrier to accommodate mail tonage, and is therefore a special charge demanding a much higher ton mile rate for mail alone to yield the same net return as express and passengers. In 1908 passenger train earnings from all sources were $674,042,400; 12.4 per cent. of the weight of trains should have yielded the railways $83,581,258, whereas the total payment for handling mail was but $49,737,519.

Mail traffic is of a class distinctly higher than express, and on account of light loading, only 2 tons average per car, must be class as *less than carload* business, while express traffic in full carloads, with no special additional equipment, approximates carload business. Wide differences in ton mile rates are sanctioned by law because of classification and size of load.

A greater disparity in rates is found in freight trains. Coal or ore is moved in the same train with silk, hops, automobiles, willow-ware, yet the carriage of low grade commodity might yield a larger net return to the carrier because of the much heavier load in the car, less exactions of the shipper, less risk of damage, etc. The following illustrates the wide range of ton mile rates in freight service:

Freight rates Per 100 Lbs., Chicago to St. Paul.

Pasenger vehicles	L.C.L.	$2.10	Agricultural implem'ts.	C. L.	.20
Motor cycles	"	1.50	Bar iron	L.C.L.	.25
Chairs	"	1.20	Bar iron	C. L.	.14
Dry goods	"	.60	Pig iron	"	.14
Sugar, coffee	"	.25	Hard coal	"	.10
Agricultural impl'm'ts	"	.40			

Rates per ton-mile for transporting freight on freight trains are often higher than rates charged for hauling and furnishing post office car facilities on passenger trains for carriage of mail, as the following indicates:

Freight Rates Omaha and Kansas City to Denver.

		Rate	
		Per 100 lbs.	Per ton-miles.
Passenger vehicles	L.C.L.	$4,275	14.6 cts.
Motor cycles	"	3.125	10.4 "
Automobiles, mus. instrmts., chairs	"	2.50	8.3 "
Railroad earnings on second-class mail matter *on passenger trains*		1.80	6.0 "

The postal deficit and its great increase in the last two years in the face of an increase of $20,000,000 in postal revenue cannot be allocated to either increases in payments to the railways or losses on increased tonnage of second-class mail matter, both of which remained stationary. Other expenses, however, of the Post Office Department absorbed the larger revenue by increasing over $30,000,000. This was in part due to extending the rural delivery (which increased $9,000,000) and for increased forces and salaries due to higher cost of living (increase $20,000,000).

Postal revenue has been increasing at the rate of $10,000,000 annually and if postal expenses are controlled they should increase much more slowly and in two or three years the deficit should disappear—unless the greater revenue is used for further improvements in service, and if it is the public should be willing to foot the bill. The railways are now underpaid and are receiving less and less of the postal revenue for greater measures of service rendered. Ten years ago, in 1899, of each dollar of postal revenue 38 cents was paid to the railways; in 1909 only 24 cents, a decrease of 14 cents, or 37 per cent. The 1909 postal deficit was 8 cents per dollar of revenue, so that had the 14 cents saved from the railway proportion (or the equivalent of $29,000,000 on basis of 1909 revenue) been used to reduce expenses instead of further serving the public it would have wiped out the deficit and left a surplus of 6 cents per dollar, or $12,000,000. Instead, however, the $29,000,000 wrung from the railways was applied to various purposes with the resulting deficit.

Whether the service shall be improved with an annual deficit or remain stationary with no deficit, or with a surplus, depends on whether further improvement of the service or a favorable financial showing is to be the paramount consideration. The able men in charge of our postal service can easily bring about either result. It is for the public to decide which they want, but in deciding we appeal for justice and a square deal for the railways.

FOREIGN RAILWAY NOTES.

The Belgian State Railways in 1909 earned 10,869,000 francs ($2,173,800), or 4 per cent. more than in 1908.

The Argentine government, acting under authority of Congress, consummated in November, 1909, the sale of the Andine Railway to the Pacific Co. and the Argentine & Great Western railways, the consideration being $12,024,320, or $27,328,000 national money. The property was delivered on November 5, the purchasing companies becoming responsible for the existing obligations and contracts relating to tne exploitation of the line pending at the time of the transfer.

January 1 the railway from Khartum southward along the west bank of the Blue Nile was opened for 120 miles to Wadi Medani, the residence of the governor of the province of Blue Nile, and headquarters of a Sudan regiment. Work is progressing on an extension for 50 miles further south. Thence the line is to turn westward, cross the White Nile at Kosti, where a bridge is going up, and eventually reach El Obeid, in Kordofan.

The Chinese government has temporarily held up the negotiations for the participation of an American syndicate headed by J. P. Morgan & Co., in the loan to build to the Hankow-Szechuen Railway. It is said that the action of the Chinese government is due to pressure brought to bear by the China Investment & Construction Co. syndicate, which has severely criticised Secretary Knox for favoring the Morgan syndicate, and which claim that the original promise of China to permit American participation in loan was made to the investment company, and that the investment company should have a share in this loan. China is understood to be friendly to the investment company.

THE ALBEMARLE SOUND TRESTLE OF THE NORFOLK & SOUTHERN RAILWAY.

BY F. L. NICHOLSON,
Chief Engineer.

The reasons for the Norfolk & Southern trestle across Albemarle sound from Edenton to Mackey's Ferry will be better understood after a brief study of the map showing the territory served, together with a statement of the growth of the property.

The region served by the Norfolk & Southern embraces the counties of Princess Anne and Norfolk in Virginia, and thirteen counties in eastern North Carolina, covering an area of 4,000 square miles. While no portion of the United States is better served with waterways than this section of the Atlantic coast, yet, prior to 1903, railway construction had been spasmodic and very limited in extent.

The Atlantic & North Carolina, which is at present the Beaufort division of the Norfolk & Southern, was built in 1858, extending from Goldsboro via Kinston and New Bern to Morehead City. The present stem of the Norfolk & Southern system was completed from Berkley via Elizabeth City to Edenton on the north side of Albermarle sound, a distance of 73 miles, in 1881. In 1887 there was built from Mackey's Ferry on the south shore of Albemarle sound and opposite Edenton, 30 miles of road extending southward to Belhaven on the Pungo river. These three lines, together with the road from Norfolk to Virginia Beach and from Clapham junction to Munden point in Virginia, embraced all the railway mileage in the whole territory now served by the Norfolk & Southern.

Within this almost virgin field the Norfolk & Southern since 1903 has created a system of lines, owned and leased, amounting to 602 miles of standard gage railway.

Without going into the details of growth, the following extensions since 1903 may be noted from the map of territory served:

From Virginia Beach via Cape Henry to Norfolk; from

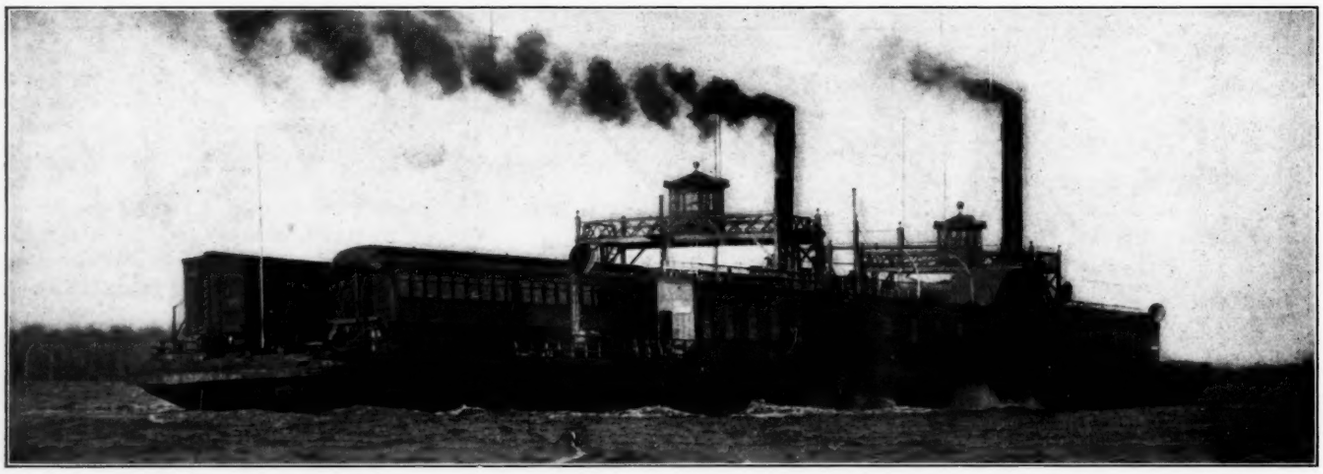
Map of the Norfolk & Southern Railway, Showing Location of Albemarle Sound Trestle.

Clapham junction to Providence junction; from Mackey's Ferry to Plymouth; from Plymouth to Washington; from New Bern via Chocowinity to Raleigh and Washington; from New Bern via Bayboro to Oriental; from Pinetown to Bishop's Cross; from Suffolk to Edenton, and from Beckford Junction to Elizabeth City.

All traffic collected south of Albemarle sound was transferred from Mackey's Ferry to Edenton by transfer steamer *John W. Garrett*, which has a carrying capacity of 23 loaded freight cars, and consumes two hours and thirty minutes for round trip. The management of the Norfolk & Southern

saw as early as 1906 that the extension of railway lines into a richly timbered and rapidly growing agricultural section would enormously increase traffic, and would soon overtax the transfer facilities at Albemarle sound. To add another transfer steamer would nearly double the cost of operation across the sound without shortening the time for passenger and freight service, and would only postpone the day when freight movement would be congested. The time had arrived when the amount of traffic justified bridging the sound, saving one hour in time of passenger service and from six to twelve hours in freight service.

Accordingly, plans were prepared for a pile trestle which, according to U. S. Government requirements, would have two large movable spans for the accommodation of navigation, and in addition, five fixed spans, which would provide passageways for motor boats. The work of construction was begun July 20, 1907, but suspended Nov. 18 on account of financial stringency, and not resumed until Feb. 20, 1909, since which time it has gone forward without interruption, and the trestle was completed and opened for traffic Jan. 17, 1910, a train carrying officers of the road passing over on Jan. 1, 1910.



Transfer Steamer John W. Garrett, in Service 1899-1910.

LOCATION.

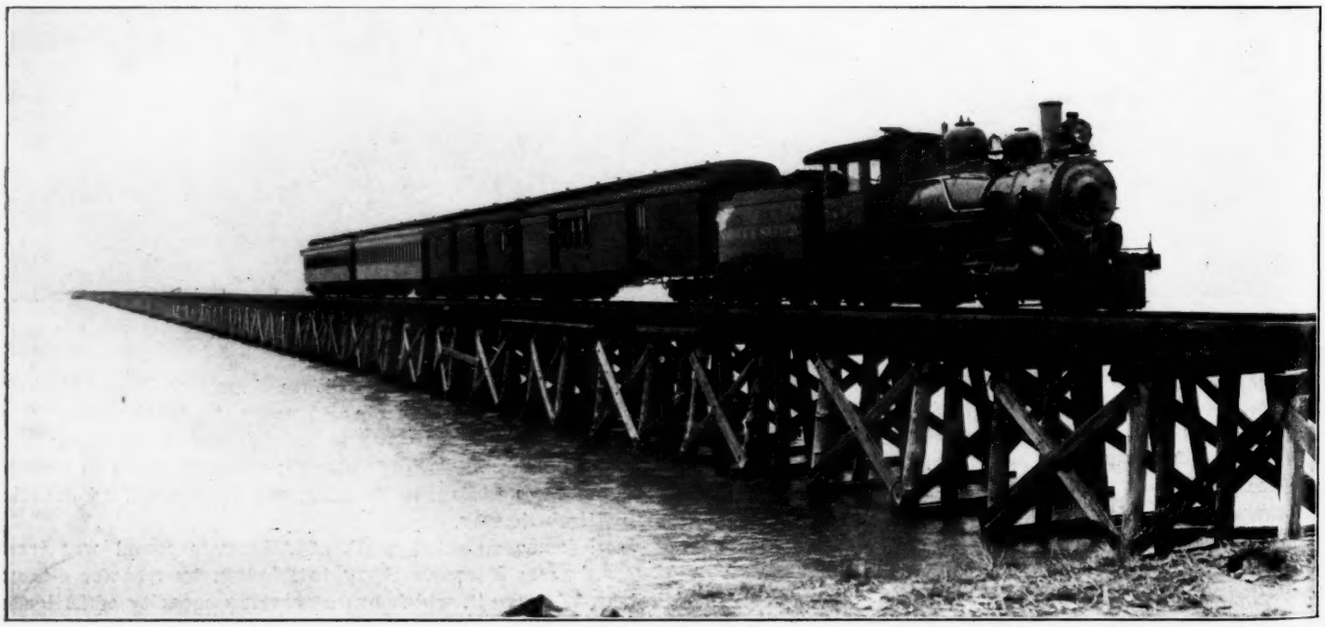
The new line leaves the old Suffolk & Carolina, now Norfolk & Southern, tracks at King street, in Edenton, and passing on a pile trestle over Johnson's creek, follows the shore of Edenton bay to the north shore of Albemarle sound at Skinner's point, a distance of 3.6 miles. From Skinner's point it crosses the sound on a trestle bearing S. 18 degrees, 34 min. 30 sec. W. to the south shore at a point 1,300 feet east of the mouth of Mackey's creek, a distance of 26,668 ft. out to out of stringers. The track then passes through Davenport's swamp and over Mackey's creek to join the old Norfolk & Southern tracks at Mackey's Ferry station, a distance of 3,378 ft. from the south end of bridge. On the north side of the trestle from Edenton to Skinner's point the ground was high and the soil sandy. The earthwork consisted of shallow cuts and fills and offered no construction problems of unusual interest. On the south side the track had to be built through a very soft, boggy swamp. The foundation for the roadbed was first mattressed with logs and brush and then filled. As anticipated, the fill sank, but on account of the mattress it sank uniformly and the track was raised. After running construction trains over it for six months the mattress of logs has now reached firm foundation and there is no longer appreciable settlement of the fill.

DEPTH OF WATER.

The average depth of water is 21 ft. for 19,000 ft. of the length, shoaling at each end to an average of 4 ft.

PILE TRESTLE.

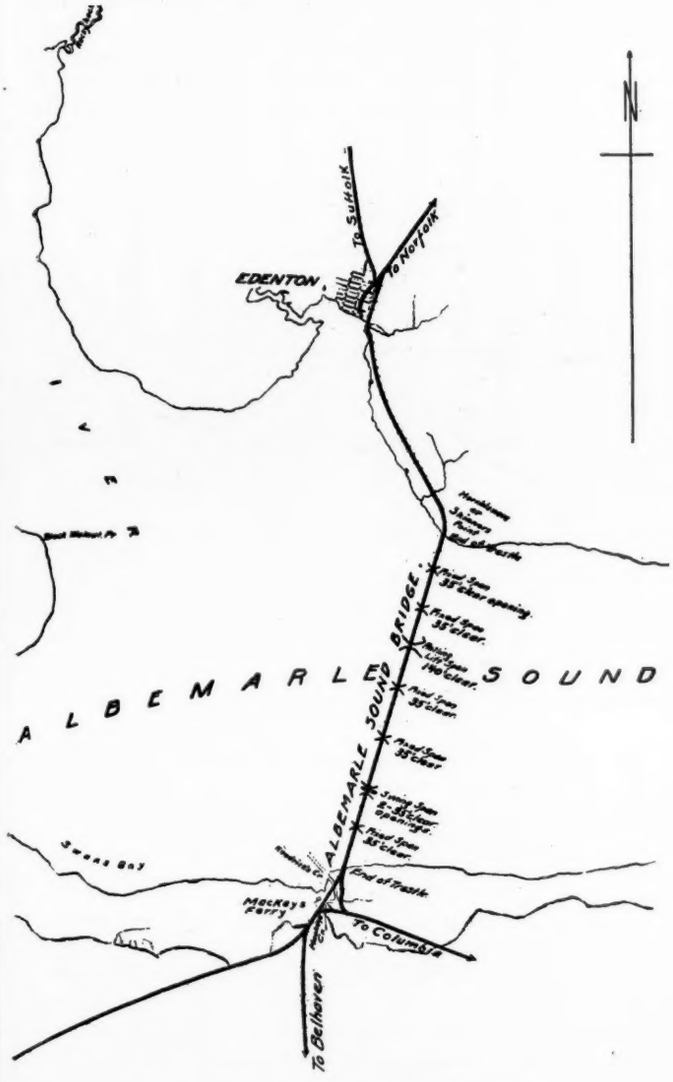
The trestle bents are spaced 12 ft. 6 in. center to center,



North End of Albemarle Sound Trestle.

with six piles to the bent. The piles are untreated long leaf pine or cypress, not less than 12 in. at a point 8 ft. below the butt nor less than 7 in. at the small end with not less than 9 in. of heart at the cut off and cary in length from 55 to 97 ft. The piles are cut off 10 ft. 2½ in. above mean water line. They were all battered and driven to safe bearing as computed by *Engineering News* formula $\frac{2\ W\ H}{S\ \text{plus}\ 1}$ and according to this formula will sustain a load of 16 to 20 tons per mile.

The minimum penetration in the bottom of the sound was 20 ft., the maximum 60 ft., the average being 40 ft. The caps



Route Map, Albemarle Sound Trestle.

are of long leaf pine 12 x 12 in., 14 ft. long, fastened to piles by ¾ x 22-in. drift bolts. Each bent is braced transversely by two horizontal braces 3 x 12 in. at mean water line, and two diagonal braces 3 x 10 in. running from outer end of cap to connection with outer piles just above jam of horizontal braces.

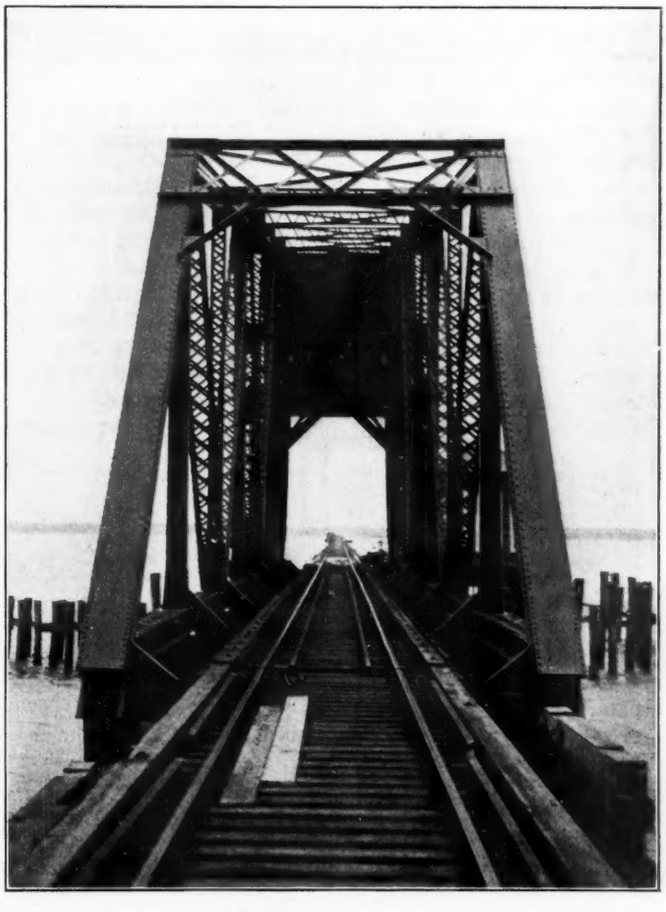
All braces are of long leaf pine, fastened to the outer piles by ¾-in. bolts and to the intermediate piles by ½ x 8-inch boat spikes. The bents are braced longitudinally in alternate bays by horizontal braces 4 x 10 in., 14 ft. long, fastened to top of caps at outer ends by ⅝ x 10-in. boat spikes, and diagonal braces 3 x 12 in. in plane of batter piles fastened to piles and at crossing by ¾-in. bolts. The stringers are of long leaf pine in two lines 8 x 16 in. under each rail fastened to caps by ¾ x 24-in. drift bolts.

The two lines of stringers are separated from each other by 2-in. cast-iron spools and held together by ¾-in. bolts. The stringers are designed for Cooper's E 40 loading, but provision is made for an additional line of 8 x 16 under each rail whenever it is desired to use Cooper's E 50 on the road, for which latter loading the steel spans to be later described are designed. The ties are of long leaf pine, 7 x 8 in., 9 ft. long, spaced 14 in. center to center, dressed on one side to uniform depth and each tie secured to alternate line of stringers by ½-in. boat spikes. Guard rails are of long leaf pine, 6 x 8 in., dapped to 5 in. over ties and fastened to alternate ties by 5 x 8-in. boat spikes and bolted at the joints with ¾-in. machine bolts. All boat spikes securing ties are left ½ inch high so as to be easily withdrawn by bar, facilitating repairs. Refuge platforms for accommodation of hand cars and workmen are built on extended ties at intervals of 1,000 ft.

PLATE GIRDER SPANS.

The United States Army engineers required the railway to provide, for the purposes of navigation, in addition to a clear opening of 140 ft. at the north channel of the sound and a 35-ft. waterway at the south channel, five passageways for motor boats, each giving 35 ft. clear waterway and 12 ft. of clear height above low water. It was decided that the requirements for motor boat traffic could be best met by the construction of through plate girder fixed spans 51 ft. 6 in., end to end of girder, giving a clear waterway of 35 ft. from inside to inside of fender piles.

Two of these fixed spans are located 3,000 ft. apart between the north shore and the north channel of the sound. Two other fixed spans, 3,887 ft. 6 in. apart, are located between the channel spans. The fifth fixed span is 3,000 ft. from the south shore. The girders are 15 ft. center to center, and are designed for Cooper's E 50 loading. The piers for girders are each formed by two trestle bents, 5 ft. center to center, eight creosoted piles to the bent. The bents are braced longitudinally, transversely and diagonally by 3 x 12-in. braces. The



One of the Spans.

caps are 12 x 12 in., 22 ft. long, supporting ten stringers, 7 x 16 in., 7 ft. 6 in. long. These stringers support five transverse pieces, 7 x 16 in., 19 ft. long, upon which the girders rest. The same methods of fastening caps, stringers and braces are here used as described above for the trestle.

The draw openings at the south channel are given by a deck plate girder swing bridge 94 ft. end to end of girders, giving 35 ft. clear opening on each side of the pivot pier from inside to inside of protection piles. The girders are spaced 6 ft. 6 in. center to center, and are designed for Cooper's E 50 loading. The pivot pier, which was founded on hard bottom, is 15 ft. 6 in. by 15 ft. 6 in., built of concrete reinforced with corrugated steel bars. It carries a turntable 13 ft. 6 in. in diameter.

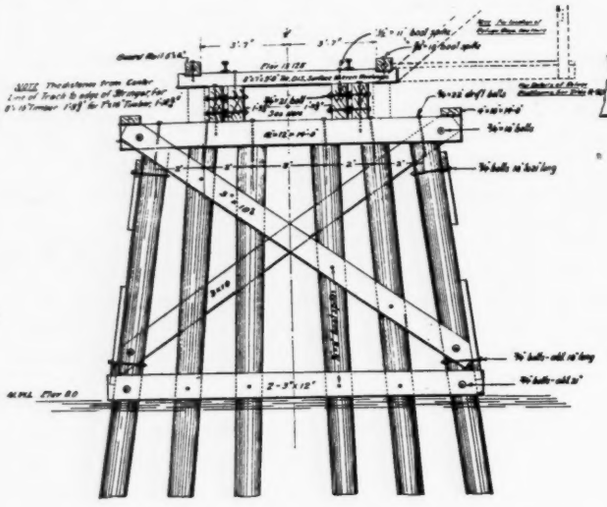
SCHERZER ROLLING-LIFT BRIDGE.

The center of the bascule span over the north channel of the sound is 9,003 ft. from the north shore. It is a single track, single-leaf through bridge of the Scherzer rolling lift type, 170 ft. 3 in. long, center to center of bearings, and 17 ft., center to center of trusses. The clear channel for navigation allowed for this span is 140 ft., measured at right angles with the channel of the sound, which makes an angle of 90 deg. with the center line of the bridge. The track girders upon which the bascule span rolls, have a depth of 6 ft. 10 in., and are supported directly by concrete piers reinforced with corrugated steel bars. The front end of the bascule span when closed is carried by a reinforced concrete pier built to the full height of the under side of the trusses. The bridge is operated by one three-cylinder gasoline engine of the Fairbanks-Morse type, 30 horsepower, worked in duplicate. The engines are equipped with self-starters and provided with speed-regulating devices capable of changing to desired speed at any time, the slow speed gears lifting bridge to full height in 1¾ minutes. The bridge is also equipped with hand-power appliances for operating the leaf.

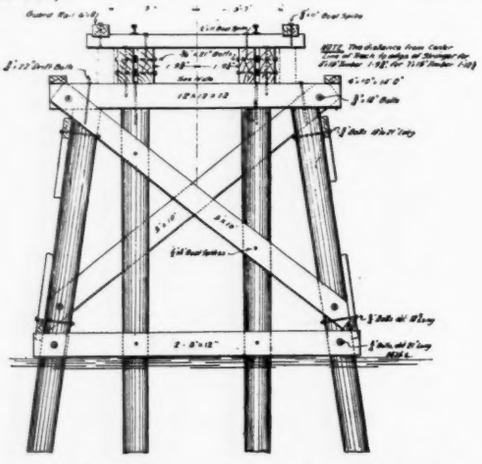
The entire work was designed in accordance with the general specifications for steel railway bridge of the American Railway Engineering & Maintenance of Way Association, 1906, for Cooper's E 50 loading.

CONCRETE PIERS—SCHERZER BRIDGE.

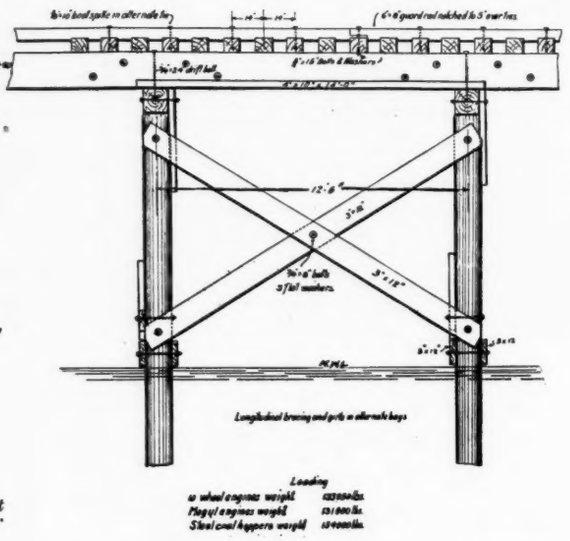
On account of the very soft material of which the sound bottom was composed, it was determined to dredge to depth required to secure satisfactory bottom on which to deposit concrete and to give necessary stiffness to pile foundation, not only to sustain the loads, but to prevent as much as possible any movement of piers under strains while operating lift at this exposed position. To do this it was necessary to dredge to depth of 16 ft. below the bottom of the sound, the depth of water at this point being 21 ft. Coffer dams of timber were driven and properly braced, enclosing space required for each pier; the soft bottom material was removed and foundation piles driven, a 2,500-lb. hammer was used, and the piles were driven to resistance, the average penetration below bottom of dredged area being 19 ft. They were then sawed off by drivers to an elevation of 2 ft. above original sound bottom. The bottom of the dredged area being of gummy material, com-

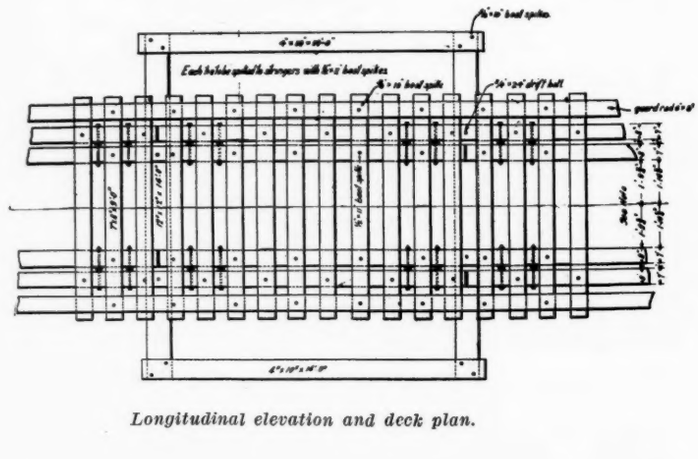


Six-leg bents used between the abutments of the extreme east and west girder spans and in other places where depth of water exceeds 10 ft.



Four-leg bents for use where depth of water is less than 10 ft.

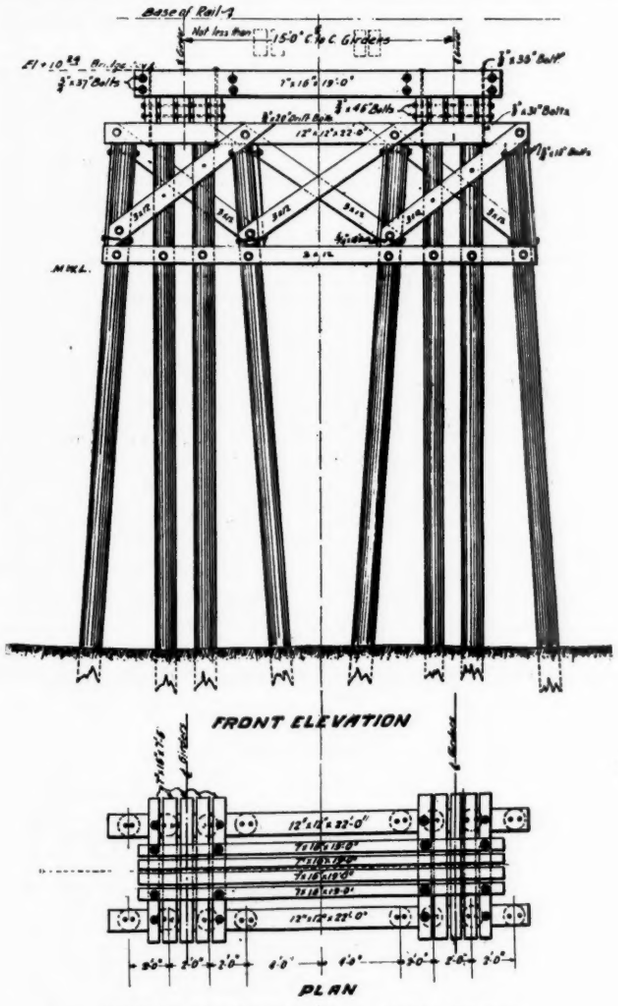




Longitudinal elevation and deck plan.

Details of Pile Trestle.

posed of sand, clay and mud, a bed of sand 2 ft. thick was laid on which to deposit the concrete. On this was placed a concrete filling of proportions 1-4-8; on this was deposited concrete proportions 1-2½-5 for 3 ft., after which the coffer dam



Details of File Piers for Girder Spans.

Loading:

10-wheel engines	133,050 *lbs.*
Mogul engines	131,000 "
Steel coal hoppers	154,000 "

was pumped out and balance of concreting completed. The concrete coping was mixed in proportions 1-1-2.

The design and construction of the whole work, including pile-trestle, steel spans, piers and foundations was executed under the direction and supervision of the Engineering Department of the Norfolk & Southern Railway Co.

EIGHT-WHEEL ENGINES WITH SUPERHEATERS FOR THE WESTERN RAILWAY OF HAVANA.

The American Locomotive Company has recently completed two eight-wheel passenger locomotives for the Western Railway of Havana, one of which is shown in the accompanying illustrations.

The chief feature of interest in connection with these engines lies in the fact that they are equipped with the builders' latest design of fire tube superheater with side headers and are the first superheater engines to be built for this road.

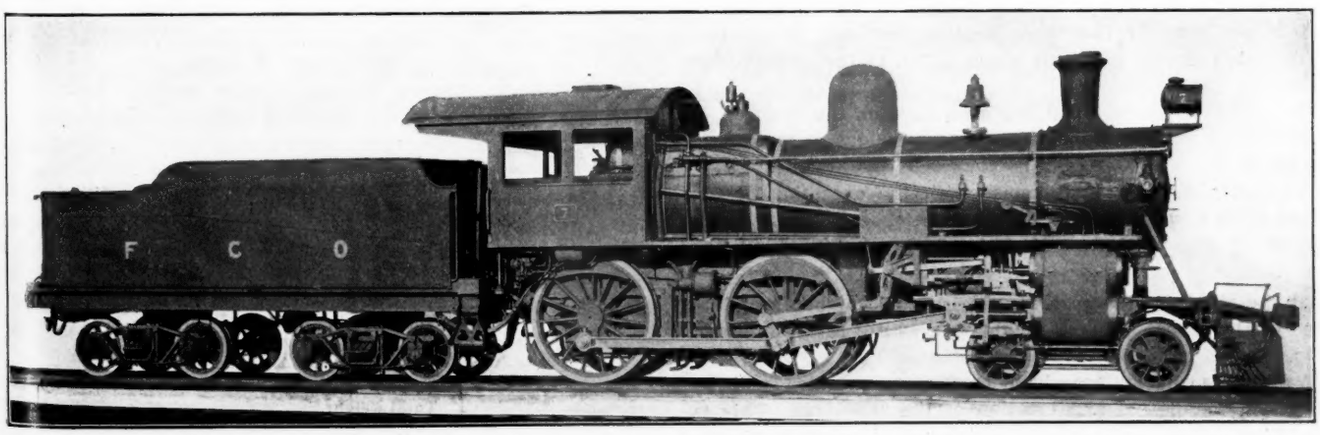
The superheater is of the same type as that applied to a consolidation locomotive recently built for the Wabash-Pittsburgh Terminal Railway by the same company and is arranged to give a moderate degree of superheat.

Briefly, this design of superheater consists of two steam headers "A," located one on either side of the smokebox and secured to a box casting bolted to the side of the smokebox. A curved pipe "B" connects the saturated steam compartment of the header with the tee-head, while the superheated steam compartment is connected directly to the steam passages in the cylinders by a pipe "C" cast integral with the header, thus reducing the number of joints.

There are twelve large boiler tubes "D" 5¼ in. in diameter outside, each of which contains four seamless steel superheating tubes "E" 1½ in. in diameter. The superheater tubes are arranged in pairs, the two tubes in each pair being connected at the back ends by cast steel return bends "F." The ends of the superheater tubes are bent around horizontally to meet the steam headers. This arrangement allows complete freedom for the expansion and contraction of the superheater tubes due to variations in temperature and thus serves to prevent leaking of the joints. The ends of the superheater pipes are upset and machined to form a ball which is ground into its seat in the header. A gland connects the ends of the two pipes in each superheater unit and they are secured to their seats by means of a single bolt which passes through the header and box casting with the unit on the back end. These bolts are thus protected from corrosion by the hot flue gases, and covered openings are provided in the side of the smokebox to give access to them from the outside. A damper is provided for controlling the passage of the gases through the 5¼-in. tubes and around the superheating pipes. This damper is automatically operated by a steam cylinder which has a pipe connection to the steam chest. When the throttle is open the pressure in the steam chest opens the damper which is closed again by a counter weight as soon as the throttle is closed.

Because of the use of superheated steam the engine carries a low boiler pressure of 165 lbs.

The cylinders are 18½-in. diameter by 24-in. stroke. Superheated steam is distributed to the cylinders by means of



Passenger 4-4-0 Locomotive for Western Railway of Havana.

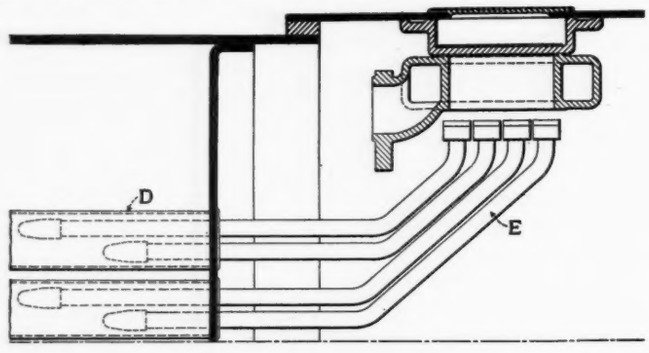
piston valves having inside admission and operated by a simple arrangement of Walschaerts valve gear.

Reversing is affected by means of a screw and hand crank.

The boiler is of the straight top type with Belpaire firebox and the barrel measures 55 in. diameter inside at the first course.

It contains 135 tubes 2 in. in diameter and 10 ft. 10½ in. long, and, as before stated, 12 tubes 5¼ in. diameter which contain the superheated tubes.

The total heating surface of the boiler is 1,071 sq. ft., of which the tubes contribute 939 sq. ft. and the remainder, or 12.3 per cent. of the total, is provided by the firebox.

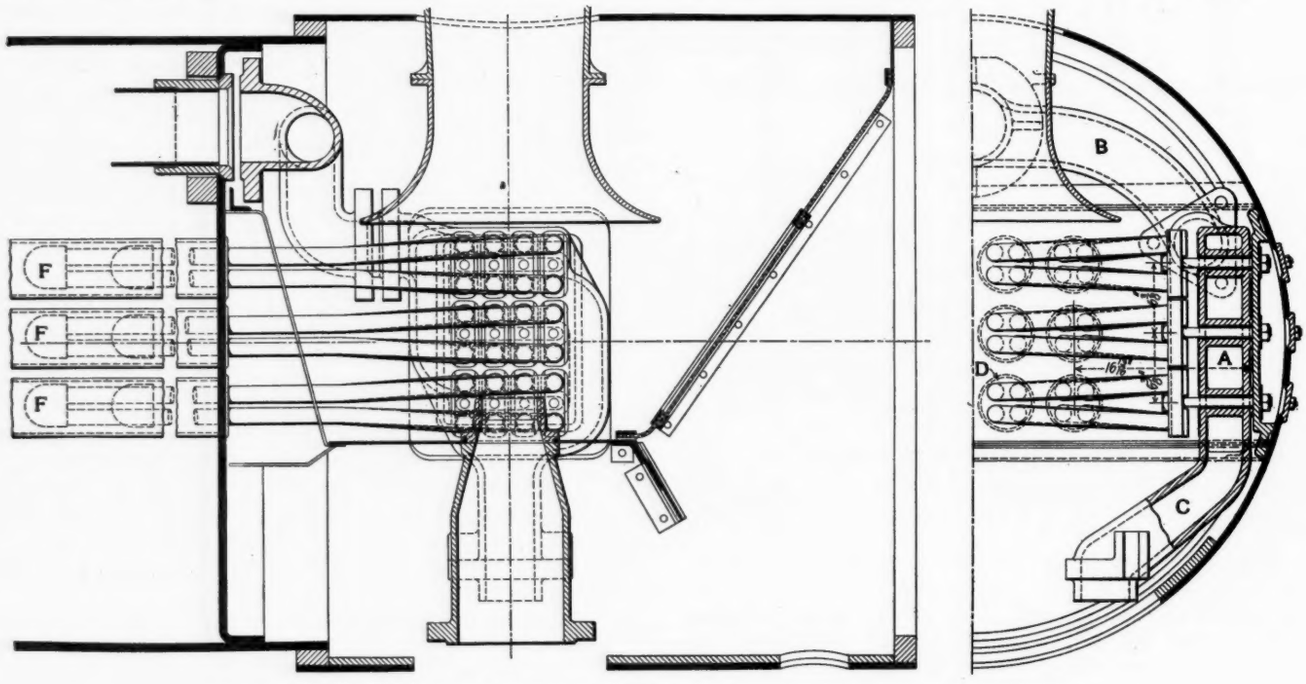


clearly shown in the accompanying illustrations of the side elevation and cross sections.

The tender is provided with a tank having a water capacity of 4,000 gallons and space for 6½ tons of coal. The tender frame is of steel, the center and side sills being constructed of 10-in. channels. The trucks are of the 4-wheel arch bar type.

The following are some of the principal dimensions of these engines:

Cylinder, diameter	18½ in.
Piston stroke	24 "
Wheel base, driving	8 ft. 6 "
" " engine	23 " 5 "
" " engine and tender	47 " 10 "
Weight on drivers	69,000 lbs.
" on front truck	114,500 "
" engine and tender	208,100 "
Heating surface, tubes	939 sq. ft.
" " firebox	132 "
" " total	1,071 "
" " superheater	158 "
Grate area	17.8 "
Journals, driving	7½ in. x 8½ in.
" truck	5½ " x 12 "
" tender	5 " x 9 "
Boiler diameter	56 "
Steam pressure	165 lbs.
Firebox, type	Belpaire
" length	75½ in.
" width	34 "
" thickness, all sheets	½ "
" water space, front	4 "
" water space, sides and back	3 "
Tubes, material of 2-in.	Charcoal iron
" " " 1½-in.	Seamless steel



Part Plan, Elevation and Sections of Firetube Superheater; Western of Havana.

The superheater has a heating surface of 158 sq. ft., which is 16.8 per cent. of the tubes heating surface. The superheater tubes extend to within about 32 in. of the firebox tube sheet.

The firebox is narrow and is placed between the frames. It is 75½ in. long and 34 in. wide, and provides a grate area of 17.8 sq. ft.

The inside firebox is of copper with the exception of the firebox tube sheet which is of steel, which explains the uniformity of the thickness (½-in.) of the metal of all the sheets.

All the staybolts in the side and back are of bronze while those in the throat are of wrought iron as are also the crown stays.

A departure from American locomotive practice will be noticed in the design and location of the sand box. This is placed just ahead of the front driving wheels underneath the boiler and is supported on the frames. The construction is

Tubes, material of 5¼-in.	Seamless steel
" number of 2-in.	135
" " " 1½-in.	48
" " " 5¼-in.	12
" length of 2 in. and 5¼ in.	10 ft. 10½ in.
Smokestack diameter	14 in.
Smokestack, above rails	13 ft. 7 "
Tank capacity, water	4,000 gals.
Tank capacity, fuel	6½ tons.
Valve travel	5½ in.
" lap	⅞-in.
" exhaust clearance	⅛-in.
" lead	⅛-in.
Wheels, diameter, driving	68 "
" " truck	33 "
" " tender	33 "
Tractive effort	17,000 lbs.

$$\frac{\text{Weight on drivers}}{\text{Total weight}} = 61.13^*$$

$$\frac{\text{Weight on drivers}}{\text{Tractive effort}} = 4.06$$

$$\frac{\text{Total weight}}{\text{Tractive effort}} = 6.73$$

* Per cent.

$\frac{\text{Tractive effort x diameter drivers}}{\text{Heating surface}}$	= 107.9
$\frac{\text{Heating surface}}{\text{Grate area}}$	= 60.1
$\frac{\text{Firebox heating surface}}{\text{Total heating surface.}\dagger}$	= 12.32*
$\frac{\text{Weight on drivers}}{\text{Total heating surface}}$	= 64.4
$\frac{\text{Total weight}}{\text{Total heating surface}}$	= 106.91
Displacement, 2 cylinders, cu. ft.	= 7.46

*Per cent. †Exclusive of superheater.

THE GERMAN FREIGHT CAR POOL.*

PARAGRAPH 1.—*Object and Extent of the Association.*

1. The Prussian-Hessian State Railways forming the Prussian State Freight Car Association, the Imperial Railways, the State Railways of Oldenburg and Mackelenburg unite with the Bavarian State Railways (including the Railways of the Palatinate), the State Railways of Saxony, Wurtemberg and the Grand Duchy of Baden to form jointly a "German State Freight Car Association" for the purpose of furthering the traffic and simplifying and decreasing the cost of management and accounting, by the common use of their freight cars.

2. The railways forming the Prussian State Freight Car Association join this agreement as independent covenanters but are represented by the Prussian-Hessian State Railways concerning all legal relations with regard to the compensation for the use of cars and the increase of the rolling stock.

3. The management of the association is incumbent on the board of directors of the Prussian-Hessian State Railways within the limits covered by this agreement and the by-laws of the association as agreed to.

PARAGRAPH 2.—*The Rolling Stock.*

1. The cars remain the property of the railways members of the association which have furnished them.

2. The rolling stock which each railway must contribute to the association consist of (exclusive of work and special cars):

379,669	freight cars for the Prussian & Hessian State Railways and the Imperial State Railways.
3,291	freight cars cars for the State Railroads of Mecklenburg.
2,323	for the State Railroads of Oldenburg.
42,391	for the Bavarian State Railways, including those of the Palatinate.
30,865	for the State Railways of Saxony.
10,097	for the State Railroads of Wurtemberg.
17,485	for the State Railroads of the Grand Duchy of Baden.
Total, 486,121	

3. Should the total rolling stock of any of the railways of the association be less than the aforesaid numbers on April 1, 1909, its quota must be completed within the three consecutive years following, exclusive of the increase prescribed in Paragraph 12.

PARAGRAPH 3.—*Use of Freight Cars.*

1. Each railway member of the association can use the freight cars of the other railways members thereof, in accordance with the rules agreed upon relative to the use of freight cars.

2. The exchange of the freight cars among the railways members of the association is no longer recorded, nor the route followed. The interchange reports formerly required showing the passing of the cars from one railway to another are no longer necessary even for freight cars not belonging to the association.

PARAGRAPH 4.—*The Distribution of Freight Cars.*

The arrangements for placing freight cars are primarily incumbent upon each management upon its own lines. The distribution of the cars as needed and their apportionment are left under the regulations relative to cars to the group of distributing stations agreed upon for the several administrative districts and between the latter and the principal office at Berlin. (See par. 13, sect. 2.)

The guiding principle in this agreement is to secure the greatest possible satisfaction in supplying the wants of the lines within the limits of the Association. With this object in view the principal car office at Berlin is authorized to direct the transfer of cars to the several districts independent of the needs of the districts ordered to furnish them.

PARAGRAPH 5.—*Facilitating the Circulation of Cars.*

The railways belonging to the association shall always regulate the circulation of freight cars in accordance with the principle prescribed and whenever a scarcity of cars occurs they shall not recoil from extraordinary expense, but shall act for the common good in conformity with the best known methods of operation and improvement in construction, obtainable within the limits of good management.

PARAGRAPH 6.—*Compensation for the Use of the Cars of the Association.*

1. Each railway member of the association pays to the latter a fixed amount, according to the number of axle kilometers run by the cars. The axle kilometers are ascertained from the rules fixed in the regulation relative to freight cars.

2. The income of the association (section 1) is distributed in proportion to the annual average of freight cars kept at the disposal of the association by each railway.

PARAGRAPH 7.—*Accounting with Railways Not Members of the Association.*

The expenses for and receipts from the renting of cars, etc., used in the traffic with railways not members of the Association are pro-rated among the association railways in proportion to the average expenses and receipts of the latter in such traffic, during the years from 1903 to 1907.

PARAGRAPH 8.—*Keeping Cars in Good Order.*

1. Each railway of the association must maintain in good order the cars of other association railways the same as it does its own cars, in conformity to the rules agreed upon regarding this matter.

2. The inspection of the cars prescribed by the railway construction and the traffic regulations shall be done as a rule, and until otherwise ordered, in the workshops of the home railway.

3. When changes are made in the construction of the cars the assent of the home railway is required.

4. Each association railway is bound to maintain the working capacity of its shops in such a way as to be able to perform the required repairing and inspection work in a reasonable time.

5. The insepction of cars, whether of the association roads or otherwise, at interchange points, is no longer required within the limits of the association.

PARAGRAPH 9.—*Accounts for the Maintenance of Cars.*

1. The work of repairing, inspection and of necessary alteration needed on cars must be done at the expense of the home railway unless the cost of it can be recovered from a third party by recourse (inclusive of non-association administrations). No compensation is obtainable for the work done by the car inspectors.

2. The home railway may pay for the cost of material and wages, and is further debited with an amount agreed upon as compensation for general work and expenses.

3. The payment of salvage for old material is waived; it becomes the property of the association railway that has done

*From a paper by W. F. Allen, in the *Bulletin* of the International Railway Congress.

the work, with the exception of the wheels and axles, which must be returned to the home railway.

4. Repair material and wheels which are to be returned must be forwarded freight free.

5. Each association railway must keep a book account of the cost of the repairs made to cars belonging to another association railway. The ascertainment of the cost is left to it, but the accounts shall be kept in such a way that the railway charged shall be able to test the accuracy of the charges by means of the papers sent in support of the claim. The railway debited with the cost has the right of examination of the accounts.

6. Bills for the cost must be presented quarterly on standard printed blanks. No further particulars can be exacted from a railway excepting the test of accuracy mentioned in section 5.

Paragraph 10.—*Uniform Construction of Cars and of Replacing Parts.*

1. The association railways must furnish cars of uniform shape, especially as regards the loading space of each kind of car, their brakes, etc.

2. They must further restrict in due course the number of patterns for the parts most frequently replaced.

Paragraph 11.—*Condemnation of Cars.*

1. Cars are destroyed by the home railways or with their express consent in accordance with uniform principles, agreed upon. Each association railway must replace its own destroyed cars.

2. The association railways must declare unfit for use any car when its employment and maintenance have become evidently difficult.

Paragraph 12.—*Continuous Increase of the Rolling Stock.*

1. The rolling stock of the association shall constantly be increased so as to render it sufficient even in time of extraordinarily large traffic. Therefore the association railways must agree on the percentage of annual increase.

2. The number of cars to be annually built shall be fixed for each association railway in proportion to the rolling stock assigned to it. (See par. 2.) As regards the quota of each type of car, the association railways must reach an understanding upon the lines to be agreed upon.

3. This agreement shall be made promptly in order to enable each association railway to appropriate the necessary amount.

Paragraph 13.—*Organization.*

1. The management of the association is incumbent upon the Royal Prussian Central Administration of Railways at Berlin. Connected with it is the Central Administration of Freight Cars, which has charge of the distribution of the cars to the entire group of railways, according to the existing stock and the supply required (see par. 4).

2. The State Railways of Bavaria, Wurtemberg, Saxony and the Grand Duchy of Baden appoint each one delegate to the Central Administration of Railways who makes reports to his own administration concerning its business.

3. The mileage accounts, etc., to be collected for the use of cars by non-association railways are kept at the Prussian car accounting office, to which the State Railways of Bavaria, Saxony, Wurtemberg and the Grand Duchy of Baden are entitled also to appoint a certain number of functionaries.

4. Amendments to the rules relative to freight cars (par. 3), may be made by the vote of the majority of those present at the assembly of the car association, in which the executive central board and each separate board of directors represented have one vote. These decisions are binding upon all members of the association, unless rejected by a majority of all members within four weeks after the mailing of a copy of the proceedings. Here again each railway of the association has one vote for each 10,000 axles in the association.

5. The rules relative to the construction, maintenance and condemnation of cars may be amended by committee, on which the non-Prussian railways shall each have one representative entitled to one vote. The decisions made by the committees become binding, unless rejected by a majority within eight weeks after the mailing of the copies of the proceedings. The number of votes to which each association railway is entitled is fixed in section 4. The amendment of the rules relating to condemned cars and the execution of the decisions concerning the objects of paragraph 10, section 2, requires the consent of the interested association railways.

6. The executive central board has the right to make sure of the uniform execution of the rules of the association by visiting the stations and looking into the local distribution of cars. The boards of the railways interested must be previously informed of such visits.

Paragraph 14.—*Expenditures of the Association.*

The association railways bear the expenses of the central car office caused by the administration of the business of the association in proportion to the number of axle kilometers run by the association cars in their tracks; but the expenses of the office for car accounting with non-association roads is divided in proportion to their share of the receipts and expenses in such traffic. See paragraph 7. The central car office and the accounting offices are credited with the amounts received by the non-Prussian employees.

Paragraph 15.—*Former Agreements are no Longer in Force.*

In the traffic between association railways the rules of the agreements concerning freight cars and all private arrangements based on them are abrogated, as far as the freight cars of the association are concerned.

Paragraph 16.—*Putting in Force or Repealing the Agreement.*

This agreement will take effect on April 1, 1909. It can be repealed on any March 31 by giving notice one year in advance, but such appeal will not become come effective before March 31, 1912.

Should a railway, member of the association, be unable to fulfil its obligation concerning the furnishing of cars, the agreement may become effective with regard to such railway, at any time after serving a three months' notice, by order of a majority vote in accordance with paragraph 13, section 3.

ACCIDENT BULLETIN NO. 33.

The Interstate Commerce Commission has issued accident bulletin, No. 33, of railway accidents in the United States during the three months ending September 30, 1909. The number of persons killed in train accidents was 193, and of injured, 3,752. Accidents of other kinds bring the total number of casualties up to 20,093 (852 killed and 19,241 injured). These reports deal only with employees on duty and passengers.

Table No. 1.—*Casualties to Persons—July, August and September,* 1909

Causes	Passengers		Employees		Tot'l persons reported	
	Kil'd.	Inj'd.	Kil'd.	Inj'd.	Kil'd.	Inj'd.
Collisions	39	1,393	70	592	109	1,985
Derailments	17	894	54	462	71	1,356
Miscellaneous train accidents	..	38	13	373	13	411
Total train accidents	56	2,325	137	1,427	193	3,752
Coupling or uncoupling	..	...	38	633	38	633
Other work abt trains or switches	..	...	31	3,960	31	3,960
In contact with bridges, etc.	1	16	28	291	29	307
Falling from cars or engines or while getting on or off	32	971	136	2,858	168	3,829
Other causes	15	1,101	378	5,659	393	6,760
Total, other than train ac'd'ts.	48	2,088	611	13,401	659	15,489
Total, all classes	104	4,413	748	14,828	852	19,241

The only favorable indication that can be discerned in the statistics of the quarter is that afforded by the fact that the totals of employees killed in train accidents and in coupling cars do not show such decided increases as do those of employees killed from other causes. These last named items might be expected to increase, because of the general increase

of traffic, and on this supposition the absence of increase in the others indicates improved conditions. Five accidents—collisions 14, 16, 24 and 1 and derailment No. 19—caused 47 deaths. The causes of these and of others in which the circumstances were notable or unusual are given in connection with Table No. 2A.

TABLE No. 1A.—*Comparisons of Principal Items with Last Bulletin and with One Year Back.*

	Bulletins		
	No. 33.	No. 32.	No. 29.
1. Passengers killed in train accidents.....	56	7	53
2. Passengers killed all causes.....	104	44	110
3. Employees killed in train accidents.....	137	92	138
4. Employees killed in coupling	38	34	39
5. Employees killed, all causes	748	544	624
6. Total passengers and employees killed...	852	588	734

The total number of collisions and derailments in the quarter now under review was 2,751 as below:

TABLE No. 2.—*Collisions and Derailments.*

			Persons	
	No.	Loss.	Killed.	Injured.
Collisions, rear	261	$273,195	17	516
" butting	171	328,155	63	1,024
" train separating	110	61,924	1	39
" miscellaneous	746	382,631	28	406
Total	1,288	$1,045,905	109	1,985
Derailments due to ·				
Defect of roadway, etc.....	268	$211,301	9	281
Defects of equipment	671	544,745	9	149
Negligence	84	37,996	3	75
Unforeseen obstruction of track	83	122,800	17	351
Malicious obstruction	14	36,149	3	68
Miscellaneous causes	343	317,118	30	432
Total	1,463	$1,270,109	71	1,356
Total collisions and derailments	2,751	$2,316,014	180	3,341
Total for same quarter of 1908....	2,567	1,950,408	176	2,729
Total for same quarter of 1907....	4,279	3,605,696	309	4,534

TABLE No. 2A.—*Causes of Forty-three Prominent Train Accidents.*

[NOTE.—R. stands for rear collision; B., butting collision; M., miscellaneous collisions; D., derailment; P., passenger train; F., freight and miscellaneous trains.]

Collisions.

No.	Class.	Kind of train.	Killed.	Injured.	Damage to engines, cars, & roadway.	Reference to record.	Cause.
1	R.	P. & F.	6	3	$600	76a	Failure to flag (See note in text.)
2	B.	P. & P.	1	9	1,820	38	Southbound train ran over misplaced switch and collided with northbound standing on sidetrack; porter of northbound had set switch straight, and afterwards went back and set for siding; cannot explain. Engineman of standing train was killed. Time, 2 p. m.
3	B.	F. & F.	0	2	3,000	69	Operator overlooked order; block signal not properly managed. (See note in text.)
4	M.	P. & F.	0	0	3,378	74	Passenger train ran into side of freight backing into sidetrack. Passenger had been flagged, but seeing automatic block signal clear, engineman resumed speed, though flagman had not been called in. Automatic signal had been cleared by foreign electric current in rails. It remained clear only a few seconds, and, according to the report, had turned again to the stop position before the engineman passed it.
5	B.	P. & P.	0	52	3,500	67	Collision of northbound extra electric car with southbound regular. Conductor of extra, while his car was on sidetrack, tried (by hand motion only) to instruct conductor on regular car passing him, bound in same direction, to hold southbound at next meeting point; but his message was not understood. Communicating orally in this way was contrary to rules.
6	B.	F. & F.	4	4	4,500	63	Despatcher gave conflicting meeting order to extra train running south and work train running north. Despatcher of 2 years' experience, but in service at this place only two months.
7	B.	F. & F.	1	2	4,520	73	Mistake in copying despatcher's order. (See note in text.)
8	B.	P. & F.	2	43	4,740	45	Extra engine, eastbound encroached on time of regular passenger train, No. 51, westbound. Engineman of extra thought the day was Sunday, on which day No. 51 does not run. Conductor was equally negligent, but offered no excuse. Brakeman had neglected to examine time table. One passenger killed.
9	R.	P. & P.	2	11	6,000	66	Passenger train (4 a.m.) delayed seriously, but flagman did not go back to protect from train following; neither did he use fusees; time interval at last preceding station, 5 minutes.
10	B.	F. & F.	1	3	6,355	72	Despatcher, in issuing an order to supersede a previous order, sent it to only one of the two trains that had had the first order.
11	B.	F. & F.	0	4	7,094	37	Conductor and engineman of northbound train forgot meeting order.
12	B.	P. & F.	3	17	8,600	7	Conductor and engineman of westbound extra train neglected to identify themselves and give proper explanation to eastbound. (See note in text.)
13	M.	P. & F.	0	0	10,000	70	Freight on siding on 3 per cent. grade accidentally started and ran against passing passenger train. Engineman moved throttle (same not being latched) when he pulled whistle.
14	B.	P. & P.	16	167	12,300	4	Westbound extra encroached on time of eastbound regular train. (See note in text.)
15	R.	P. & P.	0	43	12,775	35	Failure of block signalman to put signal in stop position after passage of passenger train, combined with inefficient flagging. (See note in text.)
16	B.	P. & P.	9	40	14,101	36	Disregard of meeting order. (See note in text.)
17	R.	F. & F.	0	0	14,200	87	Misunderstanding of orders.
18	B.	F. & F.	0	4	14,485	76	Operator failed to deliver meeting order. (See note in text.)
19	B.	P. & F.	2	7	15,000	6	Agent failed to deliver order; fireman misunderstood order as to movement of train, given by word of mouth. (See note in text.)
20	B.	P. & P.	3	6	19,000	3	Southbound ran over misplaced switch and collided with northbound standing on side track. The northbound usually held the main line at this point, and the brakeman (experienced and of good character), who went forward to the switch, set it for the side track; cannot explain.
21	B.	P. & P.	0	59	19,101	64	Westbound, 3 hrs. late, encroached on time of eastbound superior train. Conductor and engineman of westbound overlooked the fact that eastbound was superior; they also had neglected to stop at B to make entry on register. Eastbound train would have left main line at B.
22	M.	F. & F.	0	0	22,000	32	Train broke in two and rear portion, left on grade without hand brakes being set, ran back and collided with another train.
23	M.	F. & F.	4	1	29,065	43	Runaway on steep grade; 15 cars had been taken on at a way-station and the angle-cock of the air-brake pipe had not been opened at the rear of the 15 cars. Men in charge of train failed to test brakes as required by rule.
24	B.	P. & F.	8	23	29,521	75	Conductor, engineman and fireman of passenger train forgot meeting order. Engineman was killed. Conductor and fireman can give no explanation. order had been in their hands 17 minutes.
Total.....			62	500	$265,655		

(*To be continued.*)

The shipments of grain westward from stations on the Siberian Railway amounted last year to 74,700,000 bushels, chiefly wheat. There were besides considerable shipments eastward.

THE SEASONING AND PRESERVATIVE TREATMENT OF WOODEN TIES.*

BY F. J. ANGIER.

In 1908 the steam roads purchased, according to a Forest Service statement, 10,565,925 treated ties, and in addition they treated at their own plants 12,590,643, making a total of 23,156,568 for the year, or 21.8 per cent. of the total number purchased.

To-day there are upwards of seventy timber treating plants in this country. Many of them are either owned or their output contracted for by the railways, and are engaged almost entirely in treating ties.

KINDS AND QUANTITY OF WOOD USED.

It is estimated that the requirements for renewals alone amount to more than one hundred million ties annually, nearly one-half of which are of oak, about one-quarter of pine, and the balance of fir, cedar, chestnut, cypress, tamarack, etc.

Up to within a few years ago, nearly all ties were made of white oak and longleaf pine. They were obtained in large quantities, at a low cost, and combined strength with great durability. These woods are each year becoming more scarce, are rapidly advancing in cost, and as a result, the railways are turning to the so-called inferior woods, such as the red and black oaks, lodgepole, shortleaf and other pines, and the maples, gum, hemlock, beech, etc., for their supplies. The latter are not nearly so durable as the former, especially when brought in contact with the ground, and therefore require some kind of treatment to prevent decay.

It has been proved beyond all doubt, that these inferior woods can be chemically treated so that their life will be prolonged several years, making them last as long, or even longer, than the best white oak untreated.

SEASONING.

For the best results, ties, as well as other timber, should be seasoned before applying a preservative. This can be done naturally or artificially, and no doubt the former way is much to be preferred; in fact with some methods of treatment it is absolutely necessary.

Woods vary considerably in their seasoning properties. The coniferous woods check and split slightly as compared to some of the broad-leaved woods. For this reason they may be piled in more open piles and seasoned more rapidly. Such woods as ash, elm, hickory and beech seem to have a great tendency to check in rapid seasoning, and these ties should be piled closer together, and the seasoning retarded to some extent. A good plan is to place "S" irons in the ends of these ties as fast as they give evidence of splitting.

The time of the year in which ties are cut is said to have considerable influence in proper seasoning. Ties cut during the fall and winter are preferred to those cut during the summer, and some roads specify that ties will be accepted only when cut between October and the following April.

Ties should be piled at the treating plant in such a manner as to expose the greatest surface to the free circulation of the air, as the object is to dry the wood so that it may be in proper condition to take the treatment. Ties piled in open cribs season much more rapidly than when piled in solid cribs. This may be well illustrated by the following test made with green lodgepole pine ties:

	Solid Pile (9 x 9)			Open Crib Pile (7 x 2)		
	Weight.	Loss.		Weight.	Loss.	
Date of weighing.	Per tie. Lbs.	Per tie. Lbs.	Per ct. of loss.	Per tie. Lbs.	Per tie. Lbs.	Per ct. of loss.
June 9.....	152.75	....	....	155.39	....	....
June 30.....	130.93	21.82	14.28	108.06	47.33	30.45
July 15.....	114.77	37.98	24.86	99.30	56.09	36.09
Aug. 13.....	104.24	48.51	31.75	95.71	59.68	38.46
Sept. 10.....	101.33	51.42	33.66	93.44	61.95	39.86

A study of these results shows that in three weeks the loss in the open crib pile was more than twice as much as in the solid pile, or nearly as much as the solid pile lost in two months. At the end of three months there was a difference of more than 6 per cent. in favor of the open pile.

*From a paper read before the New York Railroad Club, Feb. 18.

PRESERVATIVE TREATMENT.

There are a number of different processes, or methods, of treating timber. Nearly all of them employ heavy oil of coal tar (commonly called "creosote"), or chloride of zinc, either separately or in combination. Among the more prominent processes used in this country, may be mentioned the following:

Burnett ..... Using Zinc Chloride
Bethell ..... Using Creosote
Rueping ..... Using Creosote
Lowry ..... Using Creosote
Allardyce ..... Using Zinc Chloride and Creosote
Card ..... Using Zinc Chloride and Creosote
Non-Pressure or Open Tank

The "Burnett," or as it is commonly called, the "Burnetizing" or straight zinc chloride process was introduced in 1838 by Sir William Burnett. Either seasoned or unseasoned timber may be treated, but with this, as well as nearly every other process, is it much better to have the timber thoroughly air seasoned. After the wood is prepared for treatment by air seasoning or steaming, a vacuum is usually created, then a water solution carrying from 2 per cent. to 6 per cent. of zinc chloride is introduced, filling the retort. A pressure pump is then used to pump in more solution until 100 to 150 pounds is registered on the gauge, and this pressure is maintained until the required absorption is obtained, after which the solution is withdrawn and the timber taken out.

It is generally the practice to use a solution of such strength that after the wood has absorbed all that can be forced into it within a reasonable time, it will retain about one-half pound of pure zinc chloride to the cubic foot of timber.

It is best to use ties treated with this process in comparatively dry climates, on account of the solubility of the zinc chloride, and the subsequent leaching of the zinc salts.

The "Bethell," or straight creosote process, was invented in 1838 by John Bethell. This consists of first creating a vacuum in the treating cylinder, or retort, followed by the introduction of creosote, and then applying a pressure to force the creosote into the wood.

The "Rueping" process was patented in September, 1902. Only thoroughly air-seasoned timber can be treated. The wood is first subjected to an air pressure of about five atmospheres, so that all the cells and cavities are filled with compressed air after which, while maintaining the air pressure, the impregnating liquid, under a still higher pressure is introduced into the receptacle in which the material treated is placed. The air in the receptacle is allowed to escape. The material, now being entirely covered with the liquid, pressure can be raised with a pump, thereby forcing it into the wood. After a certainty quantity is absorbed, the pressure is released, and the liquid discharged. The air, first forced into the wood cells, expands, thereby expelling the surplus oil, and this may be aided by a final vacuum. It is claimed that about 50 per cent. of the oil can be regained by this method, and enough is left in the wood to insure it against decay during the mechanical life of the tie.

The "Lowry" process was patented September, 1906. It consists of placing the ties in a retort or cylinder and closing the doors air tight. The retort is then filled with creosote and pressure applied by forcing more oil in with a suitable pump. This pressure is continued until the wood takes up a certain amount of oil, after which the free oil is quickly withdrawn. The next step is to produce a quick and high vacuum, the object being to regain a portion of the oil which was first injected into the wood, thus leaving the cell walls painted with the preservative but the cells themselves practically empty.

It is claimed that a red oak tie requires about 4½ gallons of oil, and a pine tie about seven gallons to completely saturate it, and after a quick and high vacuum, representing about 25 to 27 inches of mercury, is maintained for from one and

one-half to two hours the quantity of oil left will be about two and one-half gallons in either case, all of which is thoroughly absorbed and taken up by the fibres. This means that in the case of oak ties, about 44 per cent. is regained, and in the case of pine ties about 64 per cent. is regained by means of the final vacuum. Some tests were made to show how much oil could be regained in actual practice, and the results will be shown in another part of this paper.

With the "Allardyce" process, both zinc chloride and creosote are used. Ties are first impregnated with zinc chloride, as in the Burnetizing process, after which creosote is introduced, and a pressure applied, until two or three pounds per cubic foot are injected. The object of the after treatment of creosote is to prevent the leaching of the zinc salts.

The "Card" process was patented in March, 1906. This, as well as the Allardyce, employs both zinc chloride and creosote, but both in one solution. The creosote is mixed with the zinc chloride, in varying proportions, and is kept thoroughly mixed, under pressure, by a centrifugal pump. It not only has the advantage of a one movement process, but the oil is probably carried farther into the wood and more evenly distributed, the light soluble oils going into the heartwood with the water solution of zinc. Either seasoned or unseasoned wood may be treated.

The non-pressure process is coming more and more into use, and, as stated by W. F. Sherfesee, of the U. S. Forest Service, it provides a cheap and efficient method of treating certain of the more porous classes of timber in isolated locations, and is well suited to the small users to whom the expense of the commercial pressure plants is prohibitive.

When ties are thoroughly air seasoned, steaming is generally unnecessary, and in fact may be detrimental. When green, containing considerable sap or pitch, or when completely water soaked from lying in the water a long time, it is often necessary to resort to artificial seasoning to get a good absorption of the preservative. This is usually obtained by subjecting the timber to a steaming process, at temperatures varying from 10 to 20 pounds of steam pressure for ties or smaller timber, to 30 or more pounds for piling and large dimension material. The duration of steaming may extend over a period of from two to five or more hours, depending entirely upon the condition of the wood.

The claim made for the steaming operation is that certain elements contained in the wood are more or less liquified and are expelled by the heat generated in the cells, thereby increasing the permeability of the cell walls.

PHYSICAL EFFECTS OF TREATMENT.

Prof. Hatt, civil engineer, forest service, has made extensive tests on the effects of treatment of timber, and the following are his conclusions:

1. "A high degree of steaming is injurious to wood. The degree of steaming at which pronounced harm results will depend upon the quality of the wood and its degree of seasoning, and upon the pressure (temperature) of steam and the duration of its application. For loblolly pine the limit of safety is certainly 30 pounds for four hours, or 20 pounds for six hours.

2. "The presence of zinc chloride will not weaken wood under static loading, although the indications are that the wood becomes brittle under impact.

3. "The presence of creosote will not weaken wood of itself. Since apparently it is present only in the openings of the cells, and does not get into the cell walls, its actions can only be to retard the seasoning of the wood."

HEWED VS. SAWED TIES.

The Forest Service Department says:

"In 1908 the steam and eectric railways of the United States purchased 112,463,499 cross ties. Of this number 81.8 per cent. were hewed and 18.2 per cent. were sawed. Over 42 per cent. of the total number of ties purchased were oak, and nearly 89 per cent. of these were hewed.

"About 95 per cent. of the hewed ties and 91 per cent. of the sawed ties were purchased by the steam railways. The steam railways prefer the hewed ties, owing largely to their lower cost and greater durability, and to the better surface they afford for the frequent or periodic tamping necessitated by heavy traffic. The average cost of the sawed ties was two cents greater than of hewed ties."

In 1905 the International Railway Congress addressed the managements of all American railways asking them to state the average length of life of sawed ties as compared with hewed ties of the same kind, and if there was any difference, to what they attributed it. The replies received showed that opinions were divided. Some said they knew of no difference, while others said that hewed ties lasted somewhat longer than sawed ties. The majority, however, reported in favor of the hewed ties, stating, that as a rule, they last about two to three years longer than sawed ties. One of the reasons given was that when ties are sawed, the fibres are cut across leaving a rough surface which absorbs water with more readiness than the clean cut surface formed when a tie is hewed.

The objection to the sawed tie is no doubt true to a greater or less extent when it is used untreated, and perhaps also when treated with a water soluble preservative, but when treated with creosote, which is insoluble in water, it would seem that this argument would not hold good, and that therefore, from a preservative standpoint the sawed tie should give as good results as the hewed tie.

LIFE OF TREATED AND UNTREATED TIES.

One of the most frequent questions asked is "How long will a treated tie last?" Many points must be considered in attempting to answer such a question, as for instance, the kind of wood treated, process used, amount of preservatives injected, locality where tie is used, condition of roadbed, etc.

For comparison we should first want to know how long an untreated tie will last. Along the Burlington road in the states of Wyoming and South Dakota an untreated pine or fir tree will give a general average life of six or seven years; while in the states of Iowa, Illinois, Missouri and Eastern Nebraska, the average life may not be more than five years. A good white oak tie will last possibly nine or ten years.

Leaving white oak entirely out of the question, and considering only the inferior oaks and other short lived woods requiring treatment, it will no doubt be safe to say that the average life of untreated ties in the states named is six years, and that a good treatment costing between 15 and 20 cents per tie will easily double the life.

In certain sections of the South an untreated loblolly pine tie will not last a year. Prof. Alleman says he has seen Burnettized ties placed in Texas and after three years of service, removed on account of decay. Records kept on 5,000,000 ties on the Atchison, Topeka & San Fe Railway prove that longleaf, shortleaf and loblolly pine ties when properly treated with zinc chloride had a life of about ten and one-half years.

Out of a total of 1,929,855 ties treated with zinc chloride by the Chicago Tie Preserving Co. for the C. & E. I. Ry., 21,882 were removed for all causes, and only 12,678 removed account of decay after nine years, or less than one per cent. These ties were all mixed oaks, no white oak included.

The Burlington road treated 5,620,340 ties with the Burnettizing process during the nine years including 1900 to 1908. A careful record kept of these ties shows 38,431 removed for all causes, and 32,100 removed account of decay. This is less than one per cent. removals after nine years. These ties consisted almost entirely of lodgepole and Bull pine, and Douglas fir, and were used only in the dry climate of Wyoming, South Dakota and Western Nebraska.

LEACHING OF ZINC SALTS AND EFFECT OF IMPROPER DRAINAGE.

A series of leaching tests were made to test the rate with which zinc chloride leaches from timber treated with the Burnettizing process. Lodgepole pine and Douglas fir ties were used. Some of the ties were seasoned six months after

treatment and before the test for leaching was begun, and others were freshly treated and were full of the water solution.

To carry out this test a number of pans were constructed large enough so when filled with water an entire tie could be submerged. The object of the test was to determine whether zinc chloride would leach out from ties as rapidly as we were inclined to think would be the case, and also the relative leaching of seasoned over freshly treated ties.

The ties were first carefully treated, weighing before and after treatment, to find, as nearly as possible, the number of grains of pure zinc chloride absorbed by each tie.

To determine the amount of zinc chloride leached out, each tie was placed in the pan filled with water and left 24 hours, after which it was taken out and allowed to dry six days. This process was repeated continuously for many months After each soaking a measured quantity of the water was taken out from the pan and the amount of zinc chloride determined.

A study of these results shows that in carrying out a leaching test in this way, less than 30 per cent. of the zinc chloride can be gotten out of the wood in nearly a year's time, and that the largest part is leached out in the first 70 days, or approximately 18 per cent. It also shows that with the freshly treated ties, the leaching was much more rapid, almost the entire loss being within 70 days.

Dr. Von Schrenk, in Bulletin 41, Bureau of Forestry, has shown very clearly the manner in which salts soluble in water leach out, and the tests given above serve to emphasize the recommendations he has made that all zinc treated ties should be thoroughly dried before being laid in the track.

If more care were given to the proper drainage of the roadbed, no doubt the ties would give a greatly increased life, and the money spent for labor in doing this might return good interest on the investment. While this especially applies to ties treated with a water soluble salt it is no doubt true to a greater or less extent with ties treated with any preservative.

COMPARATIVE COST OF TREATING SEASONED VS. UNSEASONED TIES.

With some processes, air seasoned ties only can be treated, while with others either seasoned or unseasoned ties may be treated, the latter being artificially seasoned in the retorts by steaming. The question is often asked as to whether it is more economical to first season the ties in the yard, or to artificially season them in the retorts, and thereby treat them immediately as delivered to the plant.

This is a somewhat difficult question to answer, as there are so many factors to be taken into consideration, and what would apply to one locality may not necessarily apply to another. First, we would have to decide what is a seasoned tie. In the South a pine tie may be seasoned thoroughly in two months. In the northern states it may require three to six months, and even longer. For an illustration, let us take a plant situated in one of the northern states, say Illinois, for I am better acquainted with that climate. We will assume that we have a plant with a capacity of treating 1,800,000 seasoned ties annually, and that it will require an average of six months to air season the ties for treatment, necessitating the storing of 900,000 ties continually. Of course, ties will season more rapidly in warm weather than in cold weather, and some kinds of wood more rapidly than others, but the average may not be far from six months. We must further assume that we are using a process which can be adapted to either seasoned or unseasoned timber. We will also say that thoroughly seasoned ties can be treated in six hours, and that unseasoned ties will require nine hours, or in other words it will require one-half longer time to treat unseasoned timber. Of course, this will vary one way or the other, but this is no doubt a fair average.

SEASONED TIES.—*Capacity of Plant,* 1,800,000 *Per Year.*

Unloading from cars to ground to season at 0.0070 each.....	$12,600
Loading from ground to trams after seasoning at 0.0055 each.	9,900
Switching trams from yard to retorts at 0.0020 per tie.....	3,600
Loading treated ties out at 0.0065 each.....	11,700
Fixed expenses	28,800
Preservatives at 0.150 per tie.....	$270,000
Fuel (assume ⅓ less for seasoned over unseasoned ties).....	6,000
Insurance on 900,000 ties (estimated).....	3,000
Interest on 900,000 ties, or, say, 5 per cent. on $450,000....	22,500
	$368,100
600,000 more seasoned ties treated than unseasoned worth 0.0451 each. (See part 12).....	27,060
	$341,040

$0.1895 per tie.

UNSEASONED TIES.—*Capacity of Plant,* 1,200,000 *Per Year.*

Unloading one-sixth from cars to ground to enable prompt releasing of cars, and to insure a continuous supply so as not to delay plant at 0.0070 each.....	$1,400
Loading 1,000,000 ties from cars to trams for treatment, and 200,000 ties from ground to trams at 0.0055 each.....	6,600
Switching 200,000 ties from yard to retorts at 0.0020.....	400
Loading treated ties out at 0.0065.....	7,800
Fixed expenses	28,800
Preservatives at 0.150 per tie.....	180,000
Fuel (estimated)	9,000
Insurance on 200,000 ties (estimated).....	665
Interest on 200,000 ties, or, say, 5 per cent. on $100,000....	5,000
	$239,665

$0.1997 per tie.

From the above statement results show that to treat thoroughly season ties, the cost is 0.1895 per tie; whereas, the unseasoned cost 0.1997 per tie, or a difference of 0.0102 in favor of seasoning. This multiplied by 1,800,000, the capacity of the plant, represents a saving of $18,360 per year.

In addition to this saving, there would no doubt be other advantages, such as a better penetration by the preservatives and thereby getting a greater life out of the ties, and reducing the liability of weakening the timber from excessive steaming. Another important factor is that in steaming there is always a large amount of sewage to dispose of, while in non-steaming there is practically none. The disposition of sewage is always a difficult problem at any plant, because no matter how you handle it, it will eventually get into the rivers or creeks and pollute the water supply to such an extent that damage suits may result sooner or later.

RECORD OF TIES.

A record should be kept of treated ties to show what life is obtained under different conditions as compared with untreated ties. This is usually done by driving a dating nail, with the year stamped in the head, into each tie when it is placed in the track. A better way, perhaps, is to drive these nails in the ties immediately after they are treated at the treating plant. This will, at least, insure that every tie has a dating nail, whereas, if it is left to several hundred section men many ties will be put in the track without dating nails.

Section foremen should be instructed to make a monthly statement giving the number of treated ties laid and removed, with dates treated, and should give cause of removal, whether from decay, rail cut, broken, burned, etc. At the office where the permanent records are kept (preferably at the timber treating plant) these monthly statements should be recorded, keeping a separate record for each section. An annual report can then be made to the management showing results of the treatment.

No reliable information can be expected from the section men as to the different kinds of timber, because probably not one in fifty can tell one kind of wood from another, especially after it is treated. In order that accurate knowledge may be obtained as to the relative life of the different kinds of wood, special tests should be made. On the Burlington Road this was done by treating twenty kinds of wood with several different processes; one thousand ties were carefully treated and placed on each of the eighteen divisions of the system. Each kind of wood and each process was marked with a special nail so that the tie could be identified at any future time. Each lot of 1,000 ties were placed in one continuous stretch of track, and the different kinds of wood grouped together, alternating with the different processes and every seventh tie was untreated.

While the number of ties used in this test is comparatively small, it is hoped the results obtained will give a fairly good idea of the relative value of the different kinds of wood used for cross-ties.

COST OF TREATMENT AND RETURNS ON INVESTMENT.

A plant consisting of three treating cylinders, each six feet in diameter and 132 feet long, will have a capacity of about a million and one-half ties annually. Estimated cost of plant, $175,000. The life of such a plant is estimated to be at least fifteen years.

To arrive at the cost of treating ties, the following items are considered:

First—Interest. $175,000 invested at 5 per cent. compound interest for fifteen years represents an annual charge of $12,587.

Second—Depreciation. Estimating the life of the plant at fifteen years, we will charge off 6 2-3 per cent. or $11,666 annually.

Third—Insurance. The stock of ties, as well as the building should be insured and a reasonable estimate may place the annual premium at $5,000.

Fourth—Freight on Ties to Plant. It would not be right to charge all freight on ties to the treatment, but it may be reasonable to assume that every car of ties for treatment is hauled on an average of 100 miles, and we can base the freight haul on a rate of ½ cent per ton per mile. Also estimate that cars will hold an average of 390 ties each, and that the ties will average 135 pounds in weight. Thus, a million and a half ties will require 3,846 cars to haul them to the plant, and these ties weigh 101,250 tons. This represents an annual expenditure of $50,625.

Fifth—Switching. To switch 3,846 cars of ties, plus approximately 500 more containing preservatives, fuel, etc., or say a total of 4,346, in and out of plant at 50 cents per car, will cost $2,173.

Sixth—Per diem on Cars. It is not always possible to unload ties the same day received; in fact, it often happens that they are delayed a week or more from one cause or another, in which case we are called upon to pay a per diem charge of 25 cents or 50 cents. For our present purpose it may be reasonable to estimate $1 per car or an annual cost of $3,846.

Seventh—Operating Plant. This will include all labor and material other than itemized above, estimated $300,000.

Summary of Above.

	Total cost per year.	Cost per tie.
First—Interest	$12,587	$0.0084
Second—Depreciation	11,666	.0078
Third—Insurance	5,000	.0033
Fourth—Freight on ties	50,625	.0337
Fifth—Switching	2,173	.0014
Sixth—Per diem on cars	3,846	.0026
Seventh—Operating plant	300,000	.2000
	$385,897	$0.2572

We do not know just what life these ties will give, but it may be fair to assume twelve years for treated ties, and six years for untreated ties, or in other words, treating will double their life. For our purpose of comparison we will not consider tie plates in either case.

Untreated Ties.
(Life assumed as 6 years.)

First cost of tie (estimated)	$0.500	
Insurance, interest, freight, etc. (as per statement "A")	.0435	
Cost of puttin in track	.150	
Cost of tie in track		$0.693
5 per cent. compound interest on investment for six years	$0.2320	
Second renewal end of six years	0.6935	
5 per cent. compound interest on first investment for six years and 5 per cent. on second investment for six years	0.5503	
		$1.4758
Total cost of tie for period of 12 years		$2.1693
Average cost per tie per year		0.1808

Treated Ties.
(Life assumed as 12 years.)

First cost of tie (estimated)	$0.7572	
Cost of putting in track	0.15	
Cost of tie in track		$0.9072
5 per cent on $0.9072 for 12 years		.7220
Total cost of tie for 12 years		$1.6292
Average cost per tie per year		.1357
Saving per tie per year		$0.0451

Taking capacity of plant at 1,500,000 ties, this would show an annual saving of $67,650, which is nearly 39 per cent. on the original investment of $175,000.

Untreated Ties.
(Statement "A.")

Insurance (assumed to be the same as with treated ties)	$5,000.00	$0.0033
Freight (assumed to be one-half as much as with treated ties)	25,312.50	0.0169
Switching 3,846 cars of ties in and out of storage yards at 50 cents per car	1,923.00	0.0012
Per diem on cars (assumed to be the same as with treated ties)	3,846.00	0.0026
Handling ties in storage yard (unloading 1,500,000 ties from cars to ground at $0.007 each, and loading from ground to cars at same rate)	21,000.00	0.0070
Interest on 750,000 ties, or 5 per cent. on $375,000 (assuming that one-half the ties are in the storage yard constantly)	18,750.00	0.0125
	$75,831.50	$0.0435

RAILWAYS IN CENTRAL AND SOUTH AMERICA.

The railways of North America, from the Grand Trunk Pacific, in Canada, to the southernmost branch of the National Railways of Mexico, are properly spoken of as a system. On the other hand, the railways of South America, disregarding Central America, cannot properly be grouped together. This is almost equally true of the railways of Central America. The reasons for this are in the first place geographical. Mountain ranges and rivers in South America and mountain ranges in Central America so cut up the country that it would be entirely impracticable to build a network of lines binding together the whole country.

Another reason for the lack of through routes is the fact that in Central America the country is divided in large and small politically independent and not always friendly nations. One country has a 3-ft. gage as a standard; another has a meter gage, and possibly the next country will have no recognized standard gage. This, of course, makes any interchange of cars, even where physical connection exists, impossible.

While there has been no recognizable trend to the general development of South American roads as a whole, it is possible to trace the direction of development in railway building in the separate countries. Usually this development is an attempt to give the inland territory an outlet by rail to the nearest good seaboard. In some cases inland centers are connected by rail, but this connection generally forms part of some route to the seaboard. The reason for this is obvious enough. The production of raw materials, either for home consumption, with as little manufacturing as possible, or for export as raw materials, forms by far the greater part of the industry of Central and South America. Home consumption of home manufactured articles is almost unknown.

The bulletin published by the *International Bureau of American Republics*, in its annual review number, gives the latest obtainable statistics for commerce and railways in the Central and South American republics. Most of the figures given are for the calendar year 1908. This shows roughly 35,000 miles of railway in operation in Central and South America, exclusive of Mexico and the Island republic.

Starting with the northernmost republic, Guatemala, we find that this country has about 480 miles of line in operation, of which 195 miles were built in 1908. At present there is no connection by railway between Mexico and Guatemala City, but a railway is projected from Caballo Blanco, on the Occidental Railway, to Coatepeque, at which point an extension is to be made to Ayutla, connecting with Mexican roads.

Going no further south than Guatemala, the impossibility of a Pan-American railway as a through route is plain. For instance, all the railways of Guatemala are 3-ft. gage. Guatemala City is connected with both the Pacific and the Atlantic ocean, being 75 miles by railway from San Jose, on the Pacific, and 189 miles from Puerto Barrios, on the Atlantic. No freight, however, destined from the eastern coast of the United States to the western coast is routed through Guatemala. The principal product of Guatemala is coffee, and about 70,000,000 lbs. are produced annually. The Ocos Railway, which is 24 miles long and connects the coffee producing districts of

Tumpador and San Marcos with the port of Ocos, handles over 15,000,000 lbs. of coffee annually.

Honduras, lying just to the southeast, has only a few miles of road in operation. A railway from Puerto Cortez to La Pimienta, 57 miles, is in operation and has been leased to a private company. Quite a number of small railway concessions have been approved by the government, and early in 1908 the Vaccaro Company, of New Orleans, completed and opened the first 32 miles of line of a road which they are building from the Atlantic coast into the banana lands near Ceiba. The principal industry of Honduras is the raising and export of cattle, but since the sanitary regulations prohibit the importation into the United States of cattle from Central America, most of the beef shipped is to South American countries lying further south.

El Salvador, extending along the Pacific coast south and west of Honduras, is a thickly populated country producing coffee, cocoa and some rubber. There is in operation at present about 100 miles of railway, and work has been contracted for for building a line from Santa Ana, in the northeastern corner of the country, to the Guatemalan frontier.

The principal road of Nicaragua is the National Railway of Nicaragua, about 171 miles long in all, with a main line extending from Corinto to Granada. There is under construction a line from Monkey Point, on the Atlantic, to San Miguelito, 116 miles. Coffee is the principal product exported, 19,400,000 lbs. being shipped in 1906.

Costa Rica, which has only an area of 18,400 square miles, has about 400 miles of railway. With the completion of the Pacific Railway, of which the last 12 miles are now under construction, the country will have an inter-oceanic line 170 miles long. The Atlantic section of this line runs from Port Limon to San Jose, the capital, 103 miles. The Pacific section runs from San Jose to Puntarenas, on the Pacific, 67 miles. The Atlantic section is owned by an English corporation and is leased to the Costa Rica Northern, an American corporation, controlled by the United Fruit Co. The Pacific section is owned by the Costa Rica government. Both sections are well built for that section of the country and have a 3-ft. 6-in. gage. The Costa Rica Northern has been carrying out improvements and extending branch lines into the banana districts. The importation, free of all duties, of materials and supplies, including rolling stock, for an electric trolley line between Cartago and San Jose has been authorized.

East of Costa Rica lies Panama, governed, with the exception of the Canal Zone, by the republic of Panama. The only railway of any importance is that running from Colon, on the Atlantic, to Panama, on the Pacific, 47 miles. The road now handles a very large business for the workers on the canal, and also handles considerable freight shipped from New York to San Francisco and other Pacific coast ports in the United States. Of the $8,500,000 merchandise carried by this road from the Atlantic ocean to the pacific, $2,750,000 worth was destined for western ports of the United States and $5,750,000 for ports on the Pacific coast of South America or of Mexico. The merchandise shipped eastward (north) was valued at only about $1,000,000 and was shipped entirely from San Francisco to New York.

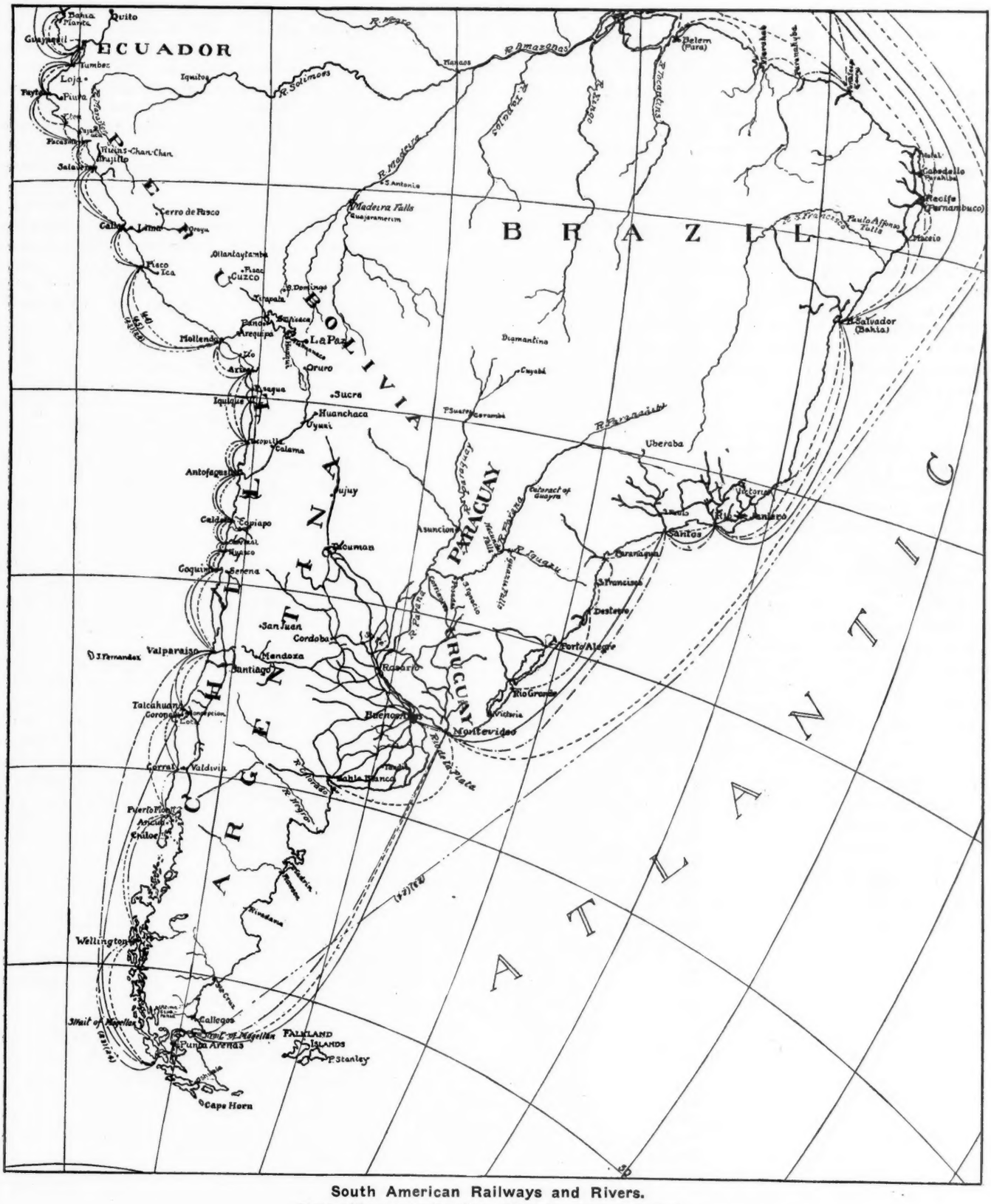
The northern section of South America is occupied by Venezuela on the east and Colombia on the west. Colombia is rich in both mineral and agricultural products. High mountains and plateaus give it a varied climate, the low lands being well adapted for raising tropical fruits, especially bananas, and the higher and cooler lands producing quite a variety of agricultural products. The country is much in need of railways to carry its products to the coast. In 1907 a rough estimate gives the mileage in operation as 450. Concessions have been granted for 1,570 miles additional. In February, 1909, the Girardot Railway was completed to Factativa. This gives Bogota, the capital, a rail connection with Girardot on the Magdalena river. The Pacific Railway, which is to connect the port of Buenaventura, on the Pacific coast, with Cali, is now under construction, and has been open for traffic as far as Papagayeros.

The development of quartz mining depends almost entirely on the opening up of new lines of railway. The mountains are thought to be rich in gold, and as soon as modern means of transportation are established, it is expected that the mining industry of the country will become of great importance. Deposits of coal have recently been discovered between the Atrato and Leon rivers. It is thought that large coal deposits exist, but the few mines that are being worked at all are only developed in a superficial way.

Venezuela's trade consists almost entirely of the production and export of raw materials. The total mileage of railways in operation is about 540 miles. There are a number of new lines under construction. The Central Railway of Venezuela is building a line which it is expected will eventually reach Santa Lucia. Although construction is now going on, there are some questions that have arisen between the government and the companies which have not as yet been settled.

Ecuador is accessible only from the Pacific ocean, communication by land with Brazil on the southeast and with Colombia on the north being nearly impossible because of dense forests and the high altitudes of mountain ranges. The most important port on the Pacific ocean is Guayaquil, which

Central American Railways and Rivers.



South American Railways and Rivers.

Lines without lettering show railways; rivers are named.

is connected by a railway with the capital of Ecuador, Quito. This line from Guayaquil to Quito was opened for operation in June, 1908, and in August of that year preliminary work was started on a line from Huigra to Cuenca. This new line will open up a rich mining and agricultural country lying in the southern section of the republic. A line is projected from Bahia de Caraquez to Quito, paralleling the line now in operation for part of its distance, but having a terminal 100 miles nearer to Panama than the Guayaquil-Quito line. There is also a branch of this Guayaquil-Quito line projected extending into a fertile district producing cacao, rubber and bananas. Cacao is the most important commercial commodity exported, and in 1908 64,000,000 lbs., valued at $6,400,000, was shipped abroad, a little more than one-fifth of this amount going to the United States. The coal mining industry has developed rapidly in recent years owing to the opening of new railway lines. In 1908 there were about 316 miles of line in operation, of which 297 miles is main line of the Guayaquil-

Quito. Regular passenger and freight trains run between these two cities, the passenger trains running only during the day and making the trip in two days.

Peru, on the south, on the Pacific ocean, is divided into three distinct zones. One, called the zona seca, or dry zone, extends along the coast to the foot of the Andes, and in it nothing can be raised without irrigation. In this zone are located the larger commercial centers. Coffee, cacao, sugar cane and Peruvian cotton are the principal agricultural exports, and the mines of the country, which are very rich, produce gold, silver, copper, iron, coal and petroleum. In 1907 the total mineral output of the country was valued at $17,495,285. In 1904 vanadium was discovered, and from June, 1906, to January, 1909, there were produced and shipped to the United States 1,800 tons of oxidized ores, containing 20 per cent. vanadic oxide. Of the total 1,471 miles of railway in operation, 844 miles is managed by the Peruvian Corporation. The Central Railway is the most important line and runs from Callao to Oroya, 140 miles, with branches to the Cerro de Pasco district. A line is ultimately to be built connecting Huancayo with Aya cucho. Second in importance to the Central Railway is the Southern Railway, running from Mollendo to Puno on Lake Titicaca, 300 miles. At the lake it connects with a line of steamers running to the Bolivian lake port of Guaqui. The connecting up of the Central Railway and the Southern Railway will require about 300 miles of new line running from Cuzco to Huancayo. A line is projected from Lima to Huacho, 157 miles, and it is estimated that it will cost, including rolling stock, $3,610,925. There are a number of short spurs from minor ports runing up the river valleys for short distances and used for the transport of agricultural products. Rolling stock on the Peruvian roads is supplied almost entirely from the United States. The Peruvian Corporation, which buys the greater part of this rolling stock, through an arrangement with the government, is extending several of the existing lines, and a contract has been let for building a line from Ilo to Moquega. There is also under consideration the question of building a railway in the eastern part of Peru, to connect with some point on the navigable section of the Maranon.

Brazil, on the Atlantic ocean, probably has the longest navigable waterways of any country in the world. There are over 10,000 miles of waterways open to navigation by river steamers and ocean-going vessels, and 20,000 miles additional open to navigation for light draft vessels and flat bottom boats. Agriculture is the principal industry of the country and coffee the principal crop. At the close of 1908 there were 11,940 miles of railway in operation, of which 633 miles were opened in 1908. Of this mileage open for traffic in 1908 the federal government owned 487 miles and the State governments 146 miles. The Madeira-Mamore, which will connect the Mamore river with the Madeira river, will make possible a direct commercial route from Bolivia to the Atlantic ocean. Besides the extension of existing lines, the transfer of freight and passengers in several of the rural districts by automobile is under consideration. Most of the larger cities have electric railways, and there is a new suburban line to be built by Brazilians to connect Petropolis with the capital.

South of Bolivia, on the Pacific ocean, lies Chile. The exports of the country are principally mineral products, which in 1908 were valued at $99,082,573. The greater part of these mineral products exported are nitrates. An effort is being made to open up extensive coal fields in the province of Arauco, and it is said that an excellent grade of coal is found in the interior, and that it can be profitably mined in considerable quantities as soon as a railway is built into this section of the country. On January 1, 1908, there were 1,590 miles of line in operation, 612 miles under construction, and 1,444 miles projected. During the year there yere 648 miles of government railways built, costing about $9,837,000. The Transandine Railway was described in the *Railway Age Gazette* of November 12, 1909, page 919. Owing to the long coast line and to the comparatively narrow extent of the country inland, a great deal of the transportation of goods is done by means of coastwise steamers. There are also a number of navigable rivers having a total of about 972 miles of waterways open to navigation.

On the east, the Argentine Republic extends to the Atlantic ocean, and the Transandine Railway has its Atlantic outlet at Buenos Ayres. The Argentine Republic produces large quantities of wheat, and in 1908 exported more corn than the United States. In 1907 the Mitre law was enacted, consolidating the various concessions made for the import of railway material, and previous to the inauguration of this law the railway companies had imported large quantities of supplies, so that in 1908 the imports of these materials were considerably less than in the year before. The country is well covered with railways, there being 15,476 miles of line in operation, of which nearly 1,000 miles were added in 1908. The total receipts during the year were estimated at $101,391,000, and the expenses were estimated at $61,368,000, leaving a profit of a little over $40,000,000. There were 48,592,600 passengers carried and 31,930,600 tons of freight hauled. Most of the lines are owned by private companies, and the total capitalization of all lines is $788,964,416, or at the rate of about $50,000 per mile.

The three government railways are the Central Norte, the Argentino del Norte and the Andean Railway, with an aggregate mileage of 1,838 miles. Buenos Ayres is the principal port, and from this city there are trunk lines running to Rosario 186 miles, to San Juan 745 miles, to Cordoba 433 miles, and a line running southeasterly into the territories of Neuquen and Tampa, 785 miles. During the 1908 year the Argentine Congress granted concessions for about 325 miles of railway, which it is estimated will involve an expenditure of nearly $25,000,000. The lines in the south are being extended to develop trade with Patagonia.

In Paraguay most of the industry of the country is confined to the production of raw material. The principal crop is maté (Paraguay tea), of which about 17,600,000 lbs. are treated annually, and about half of this amount is exported. Quebracho wood is also produced in considerable quantities and is used for tanning and for railway ties. The only line of railway in operation through the interior is the Paraguay Central, which has 155 miles in open. There is an extension of this road projected to Encarnacion, 70 miles, which when built will connect with the Argentine Northern Railway, which is now being extended to Pasadas. Building will begin on the Paraguay extension as soon as plans have been approved by the government, and material is already on the ground. Another project is for a line to run from Asuncion in a southeasterly direction to the banks of the Alto Parana, in the vicinity of the Yguazu falls. The two most important navigable rivers are the Paraguay river, with 1,800 miles open to small vessels, and the Parana river, with 676 miles open to vessels drawing 12 ft. and 600 miles additional to smaller vessels.

Uruguay is largely long rolling plains, occasionally broken up by low mountain ranges. The country is well suited to stock raising, and this is the principal industry. There are a number of packing houses, the best known one probably being the Liebig's Extract of Meat Co. Of the total 1,447 miles of railways, 780 are under State guarantee. Early in 1909 work began on the Midland branch of the Central Uruguay Eastern, running from Algorta to Fray Bentos, and also on an extension to La Sierra. Gross revenues in 1908 of the railways amounted to $4,362,666, with net earnings of $1,783,057. A bill has been introduced in Congress providing for building a railway to connect the port of Colonia with the Brazilian railways on the north. When this line is built it is estimated that a trip between Rio de Janeiro and Montevideo will be reduced to four days.

General News Section.

A press despatch from Minneapolis says that the Chicago, Milwaukee & St. Paul has laid off 1,000 shop men in that city.

The Boston & Albany is now using coke on all trains leaving Boston, both passenger and freight, for several miles out of the terminal.

On February 16 the Pennsylvania Railroad moved past Gallitzin, 12 miles west of Altoona, 180 freight trains, consisting of 7,630 cars, the highest number on record for 24 hours.

The Rock Island is now laying 100-lb. steel rails on those portions of its line where the traffic is especially heavy. The first section is the Illinois division, Chicago to Rock Island, 113 miles. The rolling of the rails for this division will begin at once.

A press despatch from Salt Lake City reports the Western Pacific as blockaded for at least a week because of extensive damage to its track throughout the 10 miles of line lying along the southern arm of Great Salt Lake, where the roadbed is built in many places in the shallow water of the lake.

The St. Louis & San Francisco has issued a pamphlet entitled "How to Ship," which describes its method of handling fast freight and tells the shipper how to get his goods to destination in the shortest time. The Frisco's method of handling fast merchandise was described in an article in the *Railway Age Gazette*, October 29, 1909, page 799. The pamphlet contains the loading schedules from the various stations and hours at which deliveries are usually made at all destinations.

The Interborough Rapid Transit Co., New York City, has been ordered by the State Public Service Commission to run in the subway the maximum number of trains throughout the day, from 6:11 a. m. to 40 minutes past midnight. In other words, the commission believes that the rush-hour service is necessary at all hours of the day and evening. The Interborough, acting on an order of the commission, is to put in all its cars running in the subway storage batteries to supply light in emergencies. At present the cars are dependent for light on the same source as that used for power.

The Western Union Telegraph Co. now has a general manager, in the person of Belvidere Brooks, hitherto general superintendent of the Eastern division. Until this appointment the duties of general manager were performed by the president. Mr. Brooks was born in Texas in 1859 and began his telegraph service as a messenger for the Western Union at Navasota, in that state, at the age of 12. He worked for two years as operator on the Houston & Texas Central, but for the last 31 years has been in the service of the Western Union. He was manager of the office at Denver, Colo., in 1890, and assistant superintendent in 1893.

Cleveland now has three-cent street-car fares with a charge of one cent extra for transfers. This is the result of an election last week wherein by a large majority the voters of the city granted a franchise. The franchise now adopted by the people has 25 years to run; and the company is entitled to no more than a 6 per cent. return on its investment as fixed by appraisal and recorded in the bond. If a trial of eight months shows that the company can earn 6 per cent. on the basis of three-cent fares and one cent for transfers, these rates will continue. Otherwise the fares can be raised to four cents each or seven tickets for 25 cents, but that is to be the maximum.

Press despatches from Baltimore last Tuesday say that the Baltimore & Ohio has rejected most of the demands made by the committees of conductors and brakemen who have been asking for higher pay, and that the leaders of the brotherhoods, rejecting all of the counter propositions made by the road, have reported to their constituents for instructions; and that there will be no further conferences until a vote shall have been taken, which will require a period of ten days. The negotiations of the brotherhood leaders with the Canadian Pacific and the Grand Trunk appear to have reached substantially the same result as on the Baltimore & Ohio, and at about the same time.

W. F. Allen, secretary of the American Railway Association, announces that the proposed change in the per diem rule whereby the interchange rate for freight cars is fixed at 30 cents for March, April, May, June and July of each year and at 35 cents during the remaining seven months has been ratified by a letter ballot, and the secretary declared the new rule to be effective March 1. The membership of the association is 340 roads, owing and controlling 2,250,007 cars. The majority requisite for approval was 171 roads and 1,500,005 cars. The result was: Yes—224 memberships, representing 1,767,162 cars; No—87 memberships, representing 419,851 cars; Not voting—29 memberships, representing 62,994 cars.

The St. Louis House of Delegates has passed the proposed ordinance fixing a maximum rate of $2 per car to be charged by the Missouri, Kansas & Texas Terminal Company for switching cars between points on its own tracks. The M., K. & T. proposes to build a terminal system in St. Louis which, it is reported, will cost $7,000,000. The proposed ordinance requires the company to file a bond of $50,000 to carry out its provisions and to pay $140,000 in cash into the city treasury within ten days after the ordinance becomes effective. The measure is carefully worded to prevent the road from attempting to nullify it by litigation. It provides that if a court of competent jurisdiction shall declare the switching rate unfair the company may charge the rate fixed by the court, and to prevent the road from taking the question into court on its own initiative it is provided that no suit may be filed by the company nor in its interest, and that if a suit is brought by other parties the city councilor, and he only, may try the case for the company and the city.

Post-Mortem Diagnosis.

Two professors of political economy representing well-known universities are reported as forecasting financial panics. No one need feel alarmed. They might have been heard from to greater advantage three years ago. The whole world has been appraised, through the break in security prices, of the unsoundness of the "boom" which was in progress during the latter part of 1909. The reactionary tendency in both trade and finance has now become so distinct that it bids fair to restore business to a sound basis, and to defer panics indefinitely.

A comparison between the crest of the last boom, 1906, last year and our brief experience of 1910, is illuminating:

	1906. Highest.	1909. Highest.	1910. Lowest.
Monthly avg. N. Y. int. rates, per cent.	8.31 Dec.	5.10 Dec.	*4.15
Average price 32 stocks	$125.10 Jan.	$121.25 Aug.	$106.42 Feb. 7
Max. rate of trade exp., per ct.	18.7 Jan.	32.3 Aug.	†11.7 Jan.

*For month ended Feb. 8. †Partly estimated.

According to averages based upon railway earnings, foreign trade, bank exchanges, mineral production and other returns, the volume of general trade is now less than 12 per cent. in excess of that of a year ago—whereas the annual rate of expansion in January, 1906, was nearly 19 per cent., and in August last more than 32 per cent. The slower pace clearly represents more normal conditions, and these are reflected in a fall of nearly 1 per cent. since December in the monthly average level of New York interest rates.

Reaction in both financial and mercantile business has already produced a more conservative feeling among the buyers and consumers of commodities and merchandise, and the consequent general lessening of the demand for goods is more than likely to have its effect upon prices—although it is noteworthy that any considerable fall in commodity prices does not usually occur until three or four months after the volume of general trade begins to decline. The London *Economist's* index number has already begun to react, thanks to the drop in cotton prices; and further decline, resulting from the cur-

tailment of the volume of trade, should do much to strengthen the weakest link in the business situation, namely, high commodity prices and high operating costs.

A general reaction in a broad view seems almost an unmixed blessing, since it promises to restore sound conditions before financial resources are strained. The trade reaction of 1903-'04 postponed a threatened crisis for four years, and similar results may fairly be expected from the reaction now in progress.—*Wall Street Journal.*

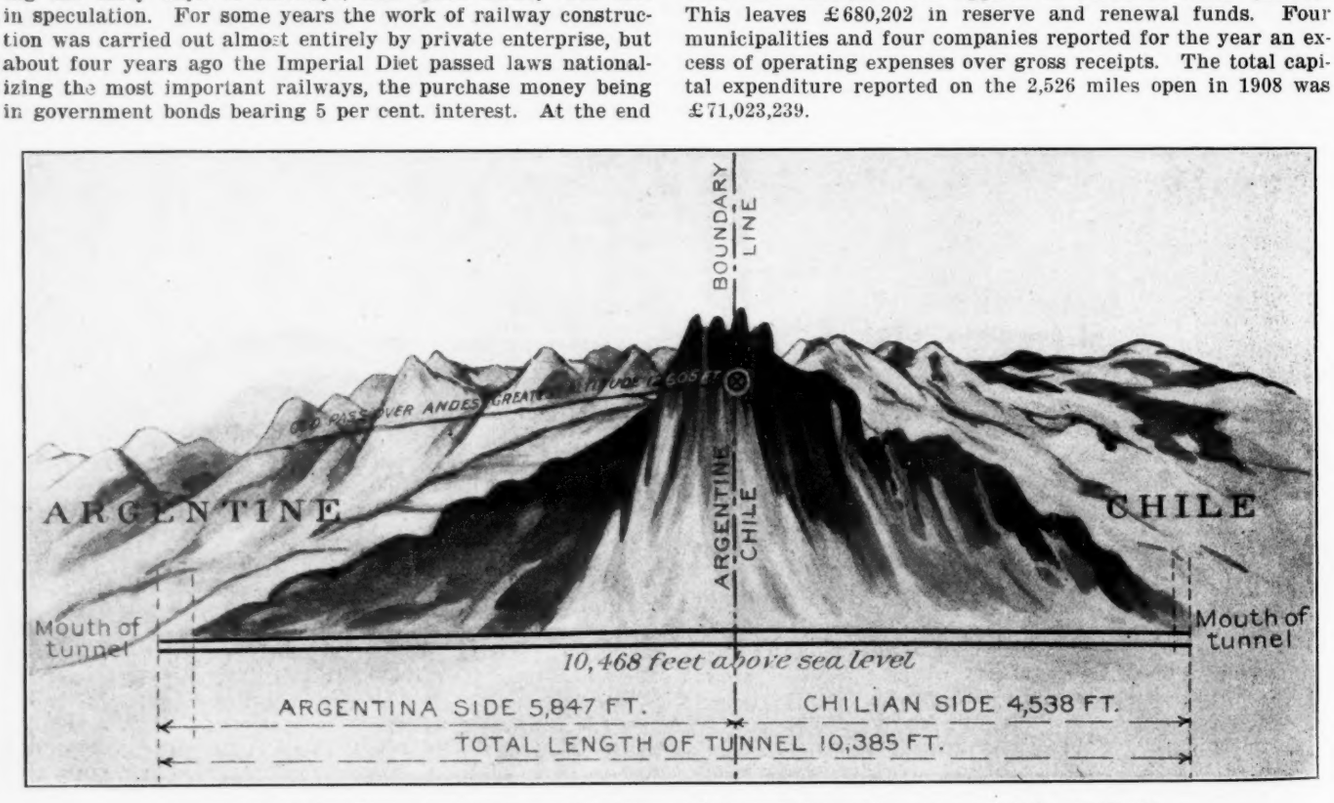
Railways in Japan.

A notable event in the history of railway development in Japan took place a short time ago, in the completion of the railway between Hitoyoshi and Kagoshima, forming as it does the last link in the Trans-Empire trunk line. Now Nayori, of Hokkaido, in the north, is in direct communication with Kagoshima in the south by a railway of 1,750 miles, and the fact has been a matter of great satisfaction and gratification to all classes in Japan. The long distance from north to south can now be traversed in five days and nights. Taking into account the conditions in Japan, the development of the railway system has been wonderful. The initiative in the construction of railways in the country was undertaken by Horatio Nelson Lay, who in 1869 arrived in Tokyo with proposals to offer a loan to the government on behalf of certain British capitalists, to be used in the construction of railways. Mr. Lay's financial arrangements fell through, and the business was taken in hand by the Oriental Bank, with R. Vicars Boyle, C. S. I., as chief engineer, and Dr. William Pole as consulting engineer in London. The first railway was opened in 1872 between Tokyo and Yokohama. The part between Kobe and Osaka was then proceeded with, but for some years the work of railway construction was slow. When, however, the Imperial College of Engineering began to turn out men who were able to assist in the work, and when others who were trained abroad returned to Japan, it proceeded more rapidly. The people of Japan quickly appreciated the importance of railways in the development of the country, and private companies were formed for railway construction. In 1896 and 1897, immediately after the war with China, there was something approaching a railway mania, like that in England during the early days of railways, and much money was lost in speculation. For some years the work of railway construction was carried out almost entirely by private enterprise, but about four years ago the Imperial Diet passed laws nationalizing the most important railways, the purchase money being in government bonds bearing 5 per cent. interest. At the end of the financial year 1907-8 the mileage of state railways open to traffic was 4,452 miles, and of private railways 445 miles. The lines have been laid out not only with a view to the development of trade and industry, but also to the defense of the country. The ports most convenient to China are connected by railway to the important centers of commerce and industry, so that not only can the resources of that huge Empire be utilized for manufacturing purposes, but the finished products can be returned for the use of the people. The lines which are necessary from a military point of view have now been pretty well provided, and in future it will be possible to look almost entirely to commercial and industrial requirements.—*Engineering.*

Electric Railways in Great Britain.

The length of tramways and light railways open for use in Great Britain and Ireland at the beginning of the year 1909 was 2,526 miles, of which the length worked by electric power was 2,360 miles, leaving 166 miles worked by horses, by steam, by cable or by gas motors. This statement, together with statistics of capital and of traffic, is published in a parliamentary paper, No. 324, which has just been issued by the Board of Trade. Of the 298 railway establishments included in this report 176 belong to towns or cities and 122 belong to companies or other parties. Of the 1,680 miles of line owned by local authorities, 1,490 miles are worked by those authorities, and the remaining 190 miles are worked by lessees. Ten years ago, when railways of this character were worked mostly by steam locomotives, the length of line open was 1,064 miles; and 30 years ago, which is called the horse period, it was only 321 miles. A comparison of the present with the steam period shows an increase of about 70 per cent. in the capital expenditure per mile of single track (from £10,469 to £17,345); a decrease in the percentages of expenses to receipts from 76.93 to 63.64, a decrease in the average receipt per passenger from 1.23d. to 1.09d., and an increase in the passengers carried per mile of line open from 806,703 to 1,053,049.

In the last year reported (1908) the net receipts of municipalities which operated their railways amounted to £3,268,514, of which £964,010 was applied to the reduction of tramway debt and £280,225 was applied to relief or rates (taxes). This leaves £680,202 in reserve and renewal funds. Four municipalities and four companies reported for the year an excess of operating expenses over gross receipts. The total capital expenditure reported on the 2,526 miles open in 1908 was £71,023,239.



Profile of the Trans-Andine Tunnel Between Chile and Argentina, Opened Nov. 27, 1909.
(Bureau of American Republics.)

Railway Matters in Washington.

Washington, Feb. 23.

Chairman Weeks, of the House Committee on Post Office, has reintroduced the elaborate bill which was presented last year for reorganizing the post office department and establishing the office of director of posts.

The Senate Committee has made a favorable report on Senator Beveridge's bill to establish a court of patent appeals with five justices.

The Senate Committee on Interstate Commerce has made favorable reports on the bills, already passed in the House, to give the Interstate Commerce Commission increased authority over details of construction of freight cars, and to amend the accident law so as to require all railway accidents to be reported monthly, and to empower the commission to investigate accidents. These bills, introduced in the House by Mr. Esch, of Wisconsin, were noticed in our issues of December 17 and 24.

The claim of the Southern Pacific for reimbursement for its expenditures in connection with the controlling of the Colorado river at the time of the break in 1906 is again before Congress, and a hearing is to be given March 11 by the House Committee on Claims. The Southern Pacific expended $1,600,000 in closing the break in the river, and thereby prevented the destruction of the farms and property in the Imperial Valley.

The administration bill to revise the Interstate Commerce law and to establish an interstate commerce court, has now been rewritten by the attorney-general for the ninth time, and was again introduced in the House last week by Mr. Townsend as H. R. 21,232. The changes made seem to be designed mainly to meet the objections of various critics. Chairman Knapp, when he was before the committee last week, suggested many changes in detail, designed to make the proposed new provisions more readily workable. The railways have continued to be conspicuous by their silence, the protests presented by officers of the Rock Island last week being about the only definite statements made by any carriers. It is said that Senator Cummins, of Iowa, who introduced a rival bill, will, supported by LaFollette and other insurgents, together with some democrats, make some objection in the Senate, and Senator Cummins may submit a minority report; nevertheless, the impression seems to be that a strong majority of the committees, both in the Senate and the House, will make harmonious and favorable reports. The principal changes that have been made are the following:

A company is left free to acqire stock and bonds of a noncompeting line, provided the aggregate amount of stock and bonds issued for such acquisition shall not exceed the fair value of the property as ascertained by the Interstate Commerce Commission, or the aggregate par value of the stock and bonds acquired without increase in the aggregate interest payable on such bonds.

The stock and bond provision is amended so as to permit the reorganization of a company and the merger of railways is not directly prohibited.

The act establishes the general principle that no stocks shall be issued by railways except at par, and no bonds except at their reasonable market or selling value as ascertained by the Interstate Commerce Commission, and where either stock or bonds is paid for in property, the fair value must be ascertained by the commission.

Where notes or other obligations made in conformity with the act are secured by the pledge of bonds, a sale of the pledged bonds to enforce the loan must be had at public auction; and notes may be made convertible into pledged bonds on the basis of the reasonable market or selling value of the bonds, as approved by the commission.

Among the further changes desired by Chairman Knapp is a provision that the proposed commerce court shall not stay an order of the commission, except by a majority vote. Another proposal is that the commission shall have 120 days instead of 60 days in which to suspend a proposed advance in rates. The commission thinks that the clause forbidding one road to acquire an interest in another should be extended to apply to competing water lines.

At the hearings before the House Committee last week on the administration bills General Manager C. W. Kouns, of the Atchison, Topeka & Santa Fe, presented an argument against the proposed law to compel the running of live stock trains at 16 miles an hour. He showed that to make even the lower average rates of speed now common it was necessary in many places to run 40 and 50 miles an hour, and declared that these speeds were injurious to the animals. Many claims for damages for injuries to animals are the result of excessive speed. The live stock traffic is costly even at present speeds. Trains have to be run long distances with but few cars. One reason why animals suffer in transit is that shippers put them into the cars when they need both food and water, and Mr. Kouns recalled one case where a whole carload of animals died, within 28 hours, from weakness due to lack of nourishment.

Among those who appeared before the House Committee to present objections to the proposed laws was T. F. Barrett, president of the Philipsburg & Susquehanna Valley. Mr. Barrett emphasized the unfavorable effect on railway investments of the severe laws now in force in New York. These laws may have been needed in New York, because in that state there had been much abuse; millions of stocks and bonds had been issued against what was "purely blue sky"; but now the state has gone to the other extreme, and railway construction enterprise has been brought to a standstill. Mr. Barrett emphasized the irrational character of a law which should require the people of Texas or California to come to Washington to get authority to use their own capital to develop their own resources.

F. S. Masten, representing the Detroit & Cleveland Navigation Company, presented objections to the provision in the proposed law empowering the commission to establish through routes and rates over a rail and water line. Under the present law this power can be exercised only when there is "no other reasonable or satisfactory" through route. These words have now been eliminated in the bill under consideration, and it looks as though the commission would have power to compel a regular steamboat line to accept rates without regard to its own interests, and without regard to the damage which tramp steamers not under the control of the government can inflict on regular lines.

E. H. Duff, representing the 17 principal steamship associations on the Atlantic coast, and E. E. Olcott, of the Hudson River Day Line, reinforced Mr. Masten's arguments.

On the last day of the hearings before the Senate Committee, President Post and other representatives of the Railway Business Association presented strong arguments supporting a general appeal for conservative action.

Merger of Arizona Roads.

The Arizona Eastern Railroad Company incorporators are: Robert S. Lovett, president; Epes Randolph, Eugene S. Ives, Charles E. Walker and Gibson Taylor, of Tucson; Benjamin Titus, D. H. Kedzie and M. M. Crocker, of Lordsburg, N. Mex. The purposes of the corporation are to take over all the Southern Pacific properties in Arizona known as "The Randolph Lines," and to build additional mileage to make the total length of the railways 1,877 miles. The properties taken over are the Arizona Eastern, the Gila Valley, Globe & Northern, the Maricopa & Phoenix, the Arizona & Colorado and the Phoenix & Eastern. The capital set aside for the acquirement of the existing lines is $5,321,400, leaving approximately $35,000,000 authorized capital to be issued in the future.

The articles of incorporation outline the contemplated plans of the new company as follows: A new line from a point on the Southern Pacific near Yuma to Phoenix, 160 miles; from Phoenix easterly and southeasterly through Arizona and New Mexico to Lordsburg, of which 250 miles are in Arizona and 30 miles in New Mexico, this line probably to include the present Phoenix & Eastern line, now operated to Winkleman, and possibly a section of the Gila Valley, Globe & Northern; a branch from the second section from Solomonville to a point near Bowie, 35 miles long; a line from San Carlos to Globe, thence through New Mexico to the Colorado border at a point on Las Animas river, this line known as the Globe-Durango, 428 miles, of which 270 are in Arizona and 158 miles in New Mexico, and of which line a section is in operation between San Carlos and Globe. There are branches from this line con-

templated as follows: A line 35 miles long from San Juan county, N. Mex., to the point of intersection of the La Plata river and the New Mexican and Colorado boundary; from Talklai, Gila county, Ariz., northeasterly to the point where this line crosses the Arizona and New Mexico boundary, a distance of 200 miles; small branches from Globe to the Live Oak mining camp and other important ore producing districts, these branches aggregating 20 miles; a branch from Globe to the Black Hawk mine and back to the main line near the Old Dominion mine; a branch from the second described line at a point near the San Francisco river, Graham county, Ariz., by way of Clifton on through New Mexico to a point on the main line between Farmington and Aztec, N. Mex., approximately 410 miles, of which 345 are in New Mexico.

The plans also describe lines to be completed from Cochise to Douglas, part of which was constructed recently from Pearce and Cochise to Courtland, Gleeson and Forrest, this line to be extended to Bisbee, Black Diamond and Turquoise, 69 miles in all; a branch from Mesa to Hansen; a branch from Florence to Casa Grande, 26 miles to the south; a branch from Florence to Maricopa, and another to Superior, and a connecting link from a point near Winkleman up San Pedro river to Benson, on the main line of the Southern Pacific.

The trans-continental Southern Pacific line is to be pushed through from the east by way of Phoenix and Yuma. Epes Randolph, president of the Randolph lines, has laid particular stress on the importance of this line. The company has submitted maps to the territorial authorities, asking permission to build a low grade line up the box canyon of the Gila river. This line would reduce the grade now encountered between Lordsburg and Mescal, and send the main line directly through the capital of the territory. Eastern capitalists, however, have desired to build a big dam at San Carlos, which would back the water up in the Box canyon, and force the railway company to take a higher grade line, which President Randolph says would mean the abandonment of this section. The people of Globe and Phoenix have been holding meetings, and seem to prefer the building of the Southern Pacific railway to the completion of the irrigation project. Government Engineer Louis C. Hill has made a report on the irrigation dam, and gives five reasons why it would not be practical. He states that there is a heavy flow of silt in the river at this point and that before the irrigated land would pay heavily on the investment, the dam would be much reduced in capacity by the deposits. He also reports a fault in the site, and that rock bottom foundations could be obtained only after extremely heavy excavation work. The irrigation project advocates claim the dam would irrigate 100,000 acres, while others reduce this estimate to one-half the acreage. If the dam promoters win out the main line through Phoenix may be abandoned.

The second big project which the Southern Pacific announces will be carried through is the completion of the line between Cochise and Douglas, which will thence be pushed on into Mexico to connect with the Yaqui river line built from Guaymas to Tonichi. Engineers are now located a few miles from Douglas, in the Sulphur Springs Valley, awaiting orders to run the line from Forrest, a distance of only 15 miles, into the smelter city.

Street Railway Strike in Philadelphia.

Traffic on the surface street car lines throughout the city of Philadelphia was stopped last Saturday by a strike of the conductors and motormen, and on Sunday there was rioting throughout the city. Similar conditions continued on Monday and Tuesday. The company succeeded in getting some new men and ran some cars, but the cars which were run carried few passengers. On Tuesday the mob attacked a train on the elevated line, which is operated by the same company. The police were powerless in innumerable cases, and on Tuesday the militia was overpowered. The mayor and other officers seem to have been in doubt whether or not to call for additional help from the state. The following summary of the situation by the *New York Herald* on Wednesday morning appears to correctly estimate the situation:

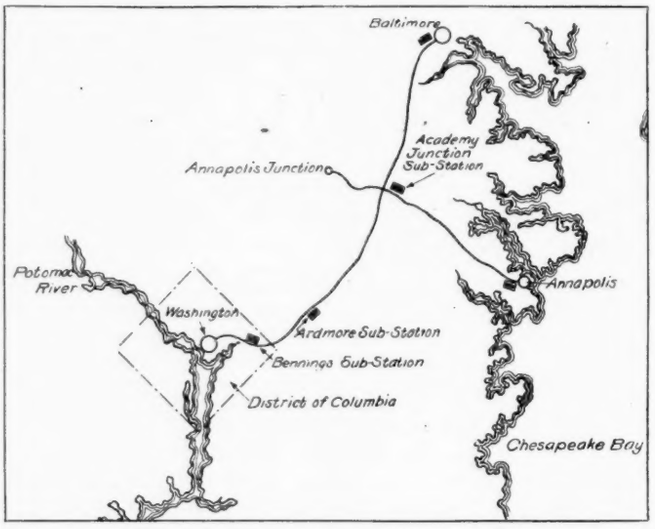
"It is a strange plight in which the order-loving old city of Pennsylvania finds itself to-night (Tuesday). With her lines of surface traffic palsied, her police derided and defied, the first detachment of her troops who were sent to restore order ingloriously beaten and disarmed, Philadelphia stands humiliated and affrighted, the butt of a mob that hourly grows more arrogant and lawless."

Record Change of Railway Installation.

On the morning of the 15th of February the Washington, Baltimore & Annapolis Railway changed its system of operation from 6,600 volts single-phase a.c. to 1,200 volts d.c., the change being made with absolutely no interference with the regular operation of the road or the maintenance of its schedule.

The decision of the railway company, some eight months ago, to make this change attracted general interest owing to the fact that it was one of the largest and most important interurban installations of a single-phase railway system.

The company's 60-ton cars, equipped for operation on the single-phase system, could not enter Washington, since, owing to the limited strength of the yokes which support the city tracks, the maximum weight of the cars was restricted to 40 tons. The railway company, now that it desired to run to the heart of the city, was confronted with the problem of securing a car of this weight equipped with motors of sufficient size to provide the high-speed and particularly high-class service required by the character of its patronage. A careful investigation of the engineering features involved showed that it was impossible to meet these requirements with their single-phase equipments.



Route Map; Washington, Baltimore & Annapolis Railway.

A contract was made with the General Electric Company in accordance with which the latter company was to provide and install the necessary equipments for both cars and substations, with the understanding that the railway company's regular service should not be interfered with in any way.

The change was actually made without any accidents. At 1:15 a.m. on the morning of the 15th the last a.c. car was taken off, and at 5:20 a.m. the first d.c. car was started. The records made under the new system substantiate the claims made by the manufacturers of the apparatus. During the first day of operation the cars ran over 4,500 car-miles, not a trip of the regular schedule being lost. Moreover, a saving of over 25 per cent. in power is indicated by the wattmeter records of the first few days.

The contractors successfully built, delivered and installed the large amount of apparatus (involving many new designs) in eight months, without any interruption of service on the line.

The Cleveland Construction Co. were the consulting engineers. They also supervised the changes in the transmission system, overhead work and changes in the substation buildings required to adapt them to the new apparatus.

What a Passenger Encounters Out West.

"Politeness" is the subject of an article in the *North Western Bulletin*, from which we take the paragraphs printed below. For the most part, however, they deal with the opposite quality, and they seem to indicate that the same kind of boorishness which used to be common among conductors and station agents 25 years ago still flourishes. It is hard to believe this concerning a road which, like the Chicago & North Western, has had volumes of fine things said about the "public servants" who wear its blue uniforms; but the *Bulletin* is an official paper and the fact that the article is admitted to its columns must be taken as evidence that the publication of such a picture is needed. This being so we guess it is needed elsewhere, so we copy. In fact, the title which we have adopted is applicable, we have no doubt, with its last two words cut off.

Railway people are tempted to be less than civil by their opportunities. Each employee represents in himself a great corporation, a very catapult of wealth and power. Work is to do; they are there to do it—all they can't slide out of some way—and every nervous query answered at ticket window or gate, every piece of baggage asked about, every extra step taken to fully satisfy a shipper or passenger, means that much more on the day. And railroading is hard work—mighty hard work. From the president down—from the waterboy up, not an employee sees anything approaching an easy time. Not if he does his duty, does what he draws his pay for.

Simmered down, the public is the employer. Contrary to the general rule, it is the employer who gets black looks, curt answers, scant information; there is a complete reversion of the ordinary relations between the spender and the receiver—employer and employee—the man who travels and the man who runs the travel wagon. Once more—if nobody traveled or shipped, there would be mighty little use for shining locomotives or upholstered coaches or long lines of freight cars. *Then* whose occupation would be gone? Answer *that*.

These complaints and downright accusations that are always coming in, they couldn't *all* spring from mistake or fiction you will acknowledge. No; their foundation is bedrock truth, not to be slewed 'round by explanations that don't explain, nor denials that fail to convince. Besides, few cases get to "the carpet," that grand final judgment seat. If each case of incivility, boorish inattention or plain, cool insolence could be immediately reported and at once acted upon, why railway service would take such a spring upward that it would be "out of sight."

To very many people who travel, the conductor is a high and mighty being, to be timorously approached and gently entreated, if at all. He knows it; he is no stranger to the idea that "if they want anything off'n him they gotter go about it the right way, that's all." He soon gets the habit of being superior to most men and women, so that the more abjectly they grovel, the more scornfully oblivious to the small needs of passengers does he become. This is the conductor—and his trainman is like unto him. Every time they come in they slam the heavy door. When they go out they slam it again for luck. It was made to be shut. If nervous passengers choose to jump nearly out of their hides, all right; it's up to them.

In cases of accident or delay, how much anxiety and often heart-wringing anguish could be spared if only one of these Great and Onlys would stoop to explain a little. Part of every trainload of through passengers will be people on their first long journey—timorous women, whose idea of travel has hitherto been bounded by the two ends of a day's trip from Chicago to Harvard and back. Now these are capable people at home, influential in their own sphere, but they are fearful when they start, because they are on unknown ground trying a new experience. They hardly know how to get a drink of water, or where the toilet is, or whether, even when there are plenty of chairs, it is admissable to move, for rest, from one to another. They do not really know how to reach the diner or to order a meal when there. They lack greatly what a railway man has to have—self-assurance.

Now then, to their timidity you add the horrors of the unknown, when, like Uncle Remus, "Dey dunno what minit gwine to de nex"—then indeed is the cup of their apprehension full. But you let somebody with the company's uniform on pass through the car, fully explaining that of danger there is none, and the delay will be slight—a freight is off, or an engine stalled, or the despatcher gave the block to let a cattle train pass, and see the difference. That explanation, backed by the uniform, is sufficient guarantee. The president, the passenger traffic manager and all their helpers could do no more.

Without doubt God made all men free and equal—the Constitution says so. But equally without doubt he early added a few touches extra to those fore-ordained to be ticket sellers and gatekeepers (and, perhaps, to sleeping car porters and dining car men). Not Solomon, in all his glory, was any harder to get at than some of them are. Their hearts are adamant—so are their faces.

All the shortcomings are not with the men on the trains, either, not by a long jump. For just let some farmer body out between Bertrand and Elk Hill try to get the section boss up to the point where he will arrange, cause, or allow to be arranged, a crossing so that Kenrick and Olaf and Friega and little Ole can get safely across to the district school (the school houses, by some mysterious dispensation, are always on the other side of the track)—just let him try it and you will think there is a hair-pulling contest in the vicinity. The farmer will get the crossing, eventually—probably with a postscript like this:

"Crossin's is ut? To the divil wid your crossin's—and you 'at can't spell your name in good American, but puts a 'Y' where Johnson begins wid 'J.' You'll set harrd workin' min at crossin's—min 'at was shwimmin' bogs before ye larnt to catch 'n' eat raw fish. Aw thin!"

McDonald don't mean anything—it's just his way. He repairs the crossing, but not until he has harrowed up the feelings of those who don't understand—those who spell Johnson with a "y."

The country agent will let a passenger stand and wait two hours and never chirp if he can help it—never breathe a word of how the connecting line has had bad luck at the junction, so that your own particular 11.13 can't possibly come along before 3.30. He knows it perfectly well, and will admit it if you drag it from him word by word. But couldn't he just as well have said to the intending passenger something like this: "I'm sorry, Mr. Mann, but the G. & L. ran in onto our main line this morning over a switch their people neglected. There's likely to be some block-up, and I'll telephone up to the hotel when things are clear."

The Telephone for Local Message Work.

Our experience on the Burlington with the telephone, as a substitute for the telegraph in train despatching, early suggested using it on message circuits. Therefore, as soon as possible after securing a train despatching circuit, we provided a second circuit and equipped it with similar selectors, using the single set of telephones in common with the train despatching circuit. The results were far beyond our expectations, it being found possible to handle as high as 350 ordinary messages in a nine-hour day on a circuit cut into thirty-two offices; and of these messages one-third were Western Union, which are always repeated but only count as one message.

One reason we were able to handle so large a number of messages was the greater promptness of the operator in answering calls. Then, too, the operator on a busy telephone circuit while finishing with one office puts out a call for the next one desired, and keeps right on working with the first office; and the second man is waiting when the first finishes.

As soon as the way station operators and the operators in the relay offices become acquainted with the slightly different methods of handling the business, especially in regard to reading the message in phrases—one phrase at a time, so that the receiving operator has the advantage of not only hearing each word spoken, but getting the sense of the message in addition—the ordinary business can be handled at the rate of one message a minute, and on the shorter ones sometimes a speed of two a minute can be attained. The average message, except where it contains hard names or difficult combinations of figures and letters, is not spelled out, but is read in phrases,

a pause being made at the end of each phrase for the receiving operator to finish putting it on paper whether by pen, pencil or typewriter. In handling Western Union messages where more frequently hard names and code words occur, these are spelled out carefully, and in addition all Western Union messages are repeated back.

We insist that the operators in relay offices be first class typists and they have a speed in receiving of not less than sixty words a minute, while some of them run up to eighty words a minute. As in train despatching, the telephone circuits frequently work through bad weather or other troubles where the telegraph is absolutely inoperative.

So great has been our success in handling the message circuits, that we are now endeavoring in every instance to secure a message circuit wherever we install a telephone for despatching. Frequently this is easily accomplished by simply using the abandoned train wire and the message wire.

With greater speed, at least equal accuracy, and ability to work the circuits through more unfavorable conditions, I feel the telephone scores again heavily over the telegraph, and I predict a rapid extension of its use for message work.

The Burlington system now has in operation twenty-six telephone despatching circuits of a total length of 2,387 miles out of a total mileage of 8,948 for the entire system. The total number of stations thus equipped is 457. There are also 25 message circuits with a total length of 2,333 miles and 429 offices on such circuits; and 2,287 miles of block wire with 474 offices are equipped with telephones.—*W. W. Ryder, in Telegraph Age.*

Telephone Despatching on the Santa Fe.

The Western Electric Company has issued in pamphlet form a reprint of an article on this subject by C. H. Gaunt, assistant general manager of the Atchison, Topeka & Santa Fe, which first appeared in the *Santa Fe Employees' Magazine.* It appears that on the Santa Fe lines nearly 2,000 miles of telephone train despatching circuits have been in use for a year, and that this will soon be increased to 3,482 miles, all consisting of metallic circuits of copper wire weighing 210 lbs. per mile. One of these circuits, from Fresno, Cal., to San Francisco, is 203 miles long, and a part of it is in the fog belt adjacent to San Francisco, where telegraph lines are usually worked with difficulty. On this line there are 32 stations. Mr. Gaunt agrees with other railway officers who have written on this subject that the telephone is not only a complete success in train despatching, but is a great improvement over the telegraph. The despatcher has fully three times as much time in which to make his calculations as under ordinary telegraph conditions. This greatly improves the accuracy and general value of his work in regulating the trains, and reduces the liability of error on his part. The pamphlet contains the following list of railways which are using the Western Electric Company's telephones for train despatching:

Atchison, Topeka & Santa Fe.
Atlantic Coast Line.
Boston & Albany.
Boston & Maine.
Carolina, Clinchfield & Ohio.
Chesapeake & Ohio.
Chicago, Burlington & Quincy.
Chicago & Northwestern.
Chicago, Milwaukee & St. Paul.
Cumberland Valley.
Delaware, Lackawanna & Western.
Denver & Rio Grande.
Denver, Laramie & Northwestern.
Erie.
Great Northern.
Illinois Central.
Lake Shore & Michigan Southern.
Lehigh Valley.
Louisville & Nashville.
Michigan Central.
Missouri Pacific
N. Y. Central & Hudson River.
N. Y., New Haven & Hartford.
New York, Chicago & St. Louis.
Norfolk & Western.
Northern Pacific.
Pennsylvania (East).
Pennsylvania (West).
Richmond, Fredericksburg & Potomac.
St. Louis & San Francisco.
Seaboard Air Line.
Southern Railway.
Southern Pacific.
Union Pacific.
Virginian.

A Contented People.

The State Railroad Commissioners held a session in this city to-day all by themselves. Nobody had a word to say about freight rates or anything else pertaining to their official functions. The commissioners occupied Judge Hughes' courtroom, staying about the place from 10 o'clock until noon, when they left for the next town which the law says they must visit. The Traffic Association had nothing to place before the commission, and nobody else seemed to care a snap of their finger for railway rates, so there was nothing to do but exchange bear stories with County Clerk Hamilton.—*Sacramento* (California) *Bee.*

Pig Iron Production.

The total production of pig iron in the United States in the last calendar year, according to the Bulletin of the American Iron and Steel Association, was 25,795,471 gross tons. For the last five years the production has been in round numbers (millions):

1909.	1908.	1907.	1906.	1905.
25.8	15.9	25.8	25.3	23.0

The number of furnaces in blast on June 30 last was 258; on December 31 it was 338, or 72 per cent. of the total number of furnaces.

Single Phase Success in England.

Owing to the success of electrical operation on its London Bridge-Victoria line the London, Brighton & South Coast Railroad Company is considering the question of extensions on the single-phase system. The electrical train service commenced on December 1, and in the first month there was an increase of 55 per cent. in traffic, and in the second month 71 per cent. Smooth and regular running, with no breakdown of consequence, is recorded. The company has got back nearly the whole of the traffic that it had previously lost to tramways, etc., on the section.

Railway Signal Association.

The papers which are to be presented at the meeting of this association in Chicago, March 14, are the following: Lightning Protection, by Otto Holstein, Government Railways, Peru, South America; Soda Copper Oxide Primary Cells on Track Circuits, by E. L. Marshall, National Carbon Company; Portable Storage Batteries, by H. M. Beck, Electric Storage Battery Company; Design of High Tension Lines for A.C. signaling, by Messrs. Rhea and Kimball, General Electric Company.

Station Agents.

The Order of Railroad Station Agents held its biennial convention in Albany, N. Y., last week. The president for the ensuing year is E. H. Morton, Greenwood, Mass.; secretary, W. D. Carleton, North Plymouth, Mass. The place selected for next year's meeting is Rochester, N. Y.

Engineers' Society of Western Pennsylvania.

At the regular meeting on February 15 a paper entitled "The Government Testing Station in Pittsburgh" was presented by J. C. Roberts, assistant chief engineer, technical branch, U. S. Geological Survey.

International Railway Master Blacksmiths' Association.

The annual meeting of this association will be held August 16-18 at Detroit, Mich. A. L. Woodworth, secretary, Lima, Ohio.

Air Brake Association.

The seventeenth annual convention will be held at the Dennisson Hotel, Indianapolis, Ind., May 10-13. The following subjects will be considered: Air Brake Instruction, Examination and Rating; Air Pump Piping, Fittings and Connections; Best arrangement of Air Pump and Main Reservoir Capacity for 100-Car Train Service; Brake Cylinders and Connections and Recommendations for Overcoming Troubles Due to Cylinder Leakage; Inspection and Cleaning of Triple Valves and Brake Cylinders; Past Year's Developments in

Air Brakes; Questions and Answers on New York Brake Equipment; Questions and Answers on Westinghouse Equipment, and Recommended Practice.

Central Railway Club.

At the annual meeting, to be held on March 11, a paper entitled "Electric Car Lighting" will be presented by J. R. Sloan.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; May 10-13; Indianapolis.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; June, 1910; Niagara Falls, Ont.
AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'NS.—G. W. Dennison, Penna. Co., Toledo, Ohio.
AMERICAN ASS'N OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio; March 18; Chicago.
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., N. Y.; 2d Friday in month; New York; March 30-April 1; Charlotte, N. C.
AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; May 18; New York.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.
AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago, March 14-17, 1910; Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis; second Tuesday, May; Memphis, Tenn.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago; June 20-22; Atlantic City.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; New York.
AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York.
ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; June 29, 1910; Colorado Springs.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Topeka, Kan.; May 25-27; Chattanooga, Tenn.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago; May 16-20, 1910; Los Angeles.
ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, N. Y.
BUFFALO TRANSPORTATION CLUB.—J. N. Sells, Buffalo.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton Bldg., Pittsburgh.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va.; June 15, 1910; California.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., N. Y.; May 24-27; Niagara Falls, Ont.
INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio; Aug. 16-18; Detroit, Mich.
INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 23-26; Chicago.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.; May; Cincinnati.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 15-17; Atlantic City.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
NORTHERN RAILWAY CLUB.—Fourth Saturday in month; Duluth, Minn.
OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Blk.; 2d Wednesday in month.
RAILROAD CLUB OF KANSAS CITY.—Third Friday in month; Kansas City.
RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; March 14; Chicago.
RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C., Collinwood, Ohio; May 16-18; St. Louis.
RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASS'N.—H. M. Buck, Secy.-Treas., 30 Church street, New York
ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Norquist, Chicago.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.
SOUTHERN & SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R. R., East Buffalo, N. Y.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; 1st Wednesday, except July and August; Chicago.

Traffic News.

The leading commercial bodies of New York city are to form a permanent league or combined organization to deal with the question of freight rates, a suggestion for such union having been received from the Trunk Line Association. The bodies joining in this league are the Chamber of Commerce, the Board of Trade and Transportation, the Produce Exchange and the Merchants' Association. Whether or not these bodies will go farther and unite with other seaboard cities in a larger organization, as has been reported probable, does not appear.

The Denver & Rio Grande has issued an interesting booklet on the growth of fruit and vegetable traffic in its territory. From Colorado, Utah and New Mexico shipments of green fruits this past season have already aggregated 7,713 carloads. In addition there have been shipped 2,000 carloads of potatoes and vegetables. It is estimated that the total output of fruit and vegetables for the 1909 season will be 11,500 carloads, and, in addition, 2,500 carloads of sugar beets were shipped to the beet sugar factory at Grand Junction, Colo., and twice as much more to Utah factories.

Advances in Rates on Fresh Meat.

Most of the railways from Missouri river points to Chicago have filed tariffs with the Interstate Commerce Commission announcing advances in their rates on fresh meat. The rates in effect were discussed in an editorial in the *Railway Age Gazette* of February 11, page 292. There was one misstatement of fact in that editorial. The present rates from Missouri river points to Chicago are: Local, 20 cents; through, 18½ cents. When advanced both the local and the through rate will be 23½ cents. But there are at least two roads which do not concur in the advances—the Chicago & Alton and the Wabash from Kansas City—so that as the tariffs now stand the rates will be raised from Omaha, while it will still be practicable to ship dressed meats at the old rates over these two roads from Kansas City. The advance is effective March 20.

The C. V. Bug Train.

The state zoologist of Pennsylvania, with four assistants, spent four days last week on the Cumberland Valley Railroad instructing the farmers along the line how to deal with the insects and diseases that infest fruit trees in that region. The title of this paragraph is the expressive name which is given, locally, to the special train, furnished by the railway company, on which the lecturers traveled.

Traffic Club of New York.

At the regular meeting held at the Hotel Astor, New York, on February 24, E. O. McCormick, assistant traffic director, Union and Southern Pacific lines, Chicago, read a paper entitled "The Importance of Passenger Business to the Railway."

Cost of Transportation Ignored.

The retail price of eggs during the season of shipment seldom exceeds by more than 5 cents the price received by the western farmer. During times of scarcity it may run up to 20 cents a dozen higher than the farmer receives. The rate of transportation does not change. The railways receive 30 cents a case for bringing eggs in refrigerator cars from Indiana and Illinois, and 60 cents from Texas and Minnesota. That is, the railways bring eggs a thousand miles to New York for a cent or a cent and a half a dozen, and 2,000 miles or so for about two cents and a half a dozen. The transportation charge that is paid the railways has no bearing whatever on the retail price in New York. If the railways performed their service gratis the consumer in all probability would pay just as much for his eggs. The average price at wholesale in 1906 was 19 cents a dozen, and the total valuation of the eggs received in Greater New York, both for domestic consumption and for export, was $24,067,439.—*Evening Post*, New York.—The foregoing is from a long article on the cost of living. The reference to the cost of transportation is merely incidental.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF DECEMBER, 1909.

(See also issues of Feb. 4, 11 and 18.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenues (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Ann Arbor	301	$106,482	$37,096	$155,523	$18,503	$24,072	$3,594	$55,329	$4,076	$105,574	$49,949	—$4,369	$12,330	$33,249	$14,847
Buffalo & Susquehanna	361	149,607	16,658	172,832	30,735	65,808	2,126	77,830	7,922	184,421	—11,589	—45	4,000	—15,634	—49,352
Canadian Pacific lines in Maine	233	89,786	34,160	132,495	10,098	19,462	5,251	53,214	1,254	89,279	43,216	.....	5,000	38,216	36,946
Charleston & Western Carolina	340	105,714	34,450	147,300	29,664	16,043	3,516	50,162	3,395	102,778	44,522	.....	4,475	40,047	1,462
Chicago & Alton	998	669,229	333,031	1,089,575	193,153	141,063	35,891	428,162	32,438	830,707	258,868	—1,549	32,000	225,319	—121,471
Chicago & Erie	269	325,738	68,170	434,113	33,921	88,850	15,790	194,351	9,293	342,205	91,908	.....	10,938	80,970	22,537
Chicago, Cincinnati & Louisville	284	90,171	23,169	121,172	16,133	26,112	7,825	65,769	6,344	122,183	—1,011	.....	3,405	—4,416	—15,072
Chicago, Peoria & St. Louis	255	124,741	21,207	152,119	23,374	32,264	6,942	65,014	4,900	132,494	19,625	.....	4,150	15,475	—2,612
Colorado Midland	337	135,425	24,613	184,849	16,058	33,354	11,373	93,096	5,706	159,587	25,262	—1,028	9,350	14,884	—24,620
Detroit, Toledo & Ironton	441	106,050	12,945	129,162	24,998	34,589	2,788	66,516	3,733	132,624	—3,462	.....	6,510	—9,972	—19,958
Duluth & Iron Range	168	107,780	26,886	139,362	99,192	48,615	326	75,497	29,264	252,894	—113,532	—5,525	48,419	—167,476	—64,996
Duluth, Missabe & Northern	289	176,737	35,739	218,669	102,138	60,925	1,434	71,398	30,020	265,915	—47,246	—491	88,878	—136,615	—20,967
Duluth, South Shore & Atlantic	600	139,633	81,966	236,364	29,760	29,305	8,406	89,187	7,543	164,201	72,164	1,277	36,146	37,294	14,122
Georgia	307	180,268	85,643	282,259	34,661	43,381	10,005	98,126	7,578	193,751	88,508	.....	2,639	85,869	38,137
Georgia Southern & Florida	395	118,244	71,799	227,831	18,367	44,570	5,659	79,665	8,559	156,820	71,011	.....	8,812	62,199	17,860
Hocking Valley	350	457,376	71,116	550,233	80,066	103,254	7,488	183,320	9,470	383,598	166,635	—4,031	20,502	142,102	81,104
Iowa Central	558	214,446	40,903	267,027	30,054	44,486	8,398	125,714	8,223	216,875	50,152	.....	7,418	42,734	—4,679
Kanawha & Michigan	175	169,613	27,098	201,486	45,230	52,171	2,992	56,884	4,585	161,862	39,624	—11	6,780	32,833	44,034
Louisiana & Arkansas	225	81,760	16,571	102,266	10,778	17,579	1,798	26,356	4,178	60,689	41,577	.....	1,760	39,817	7,545
Louisiana Ry. & Nav. Co	350	81,291	17,552	110,546	26,281	12,277	4,982	44,625	5,783	93,948	16,599	.....	4,250	12,349	—8,886
Louisiana Western	198	117,448	54,840	180,863	18,381	32,096	6,198	52,449	6,896	116,021	64,842	—1,747	10,138	52,957	—32,982
Minneapolis & St. Louis	1,027	236,516	84,347	347,215	35,634	55,869	11,760	163,090	12,237	278,590	68,625	100	17,433	51,292	—60,828
Missouri Pacific Ry	3,881*	1,403,594	366,999	1,973,893	344,073	295,100	52,793	908,209	61,021	1,661,196	312,697	—2,192	80,401	230,104	.....
New York, Ontario & Western	546	529,637	82,351	636,951	46,053	110,577	10,484	260,634	16,025	443,773	193,178	—3,818	16,667	172,693	36,535
New York, Susquehanna & Western	151	152,971	51,770	234,140	26,106	21,925	1,274	84,460	3,415	137,180	96,960	—3,231	11,317	82,412	11,743
Northern Pacific	5,838†	2,669,540	1,380,718	4,389,907	549,168	735,094	89,102	1,939,039	96,701	3,409,104	980,803	211,599	166,816	1,025,586	—1,437,205
Pittsburgh Shawmut & Northern	240	92,742	8,676	103,078	11,984	23,388	975	34,871	3,105	74,323	28,755	.....	1,552	27,203	14,956
St. Joseph & Grand Island	319	77,662	28,805	115,721	38,680	15,950	6,121	56,833	5,819	123,403	—7,682	—250	6,618	—14,550	—52,061
St. Louis, Brownsville & Mexico	455	83,638	42,789	134,269	35,526	10,391	2,451	47,038	7,169	102,575	31,694	.....	1,000	30,694	14,613
St. Louis, Iron Mtn. & Southern	2,610	1,605,419	486,096	2,274,841	306,013	281,957	51,858	718,009	69,953	1,427,790	847,051	—2,420	70,376	774,255	—867
Santa Fe, Prescott & Phoenix	257	84,806	25,545	117,559	18,028	10,304	1,925	33,109	5,711	69,077	48,482	.....	10	48,472	—3,131
Spokane, Portland & Seattle	420‡	155,287	60,055	226,294	47,971	30,242	3,896	97,230	7,449	186,788	39,506	—343	39,368	—205	—43,766
Texas Central	268	63,657	34,883	106,873	12,058	11,557	1,704	31,536	4,228	61,083	45,790	.....	3,076	42,714	—10,820
Toledo, Peoria & Western	248	65,178	34,078	103,760	19,232	18,478	2,238	38,975	2,864	81,787	21,973	.....	5,000	16,973	2,173
Toledo, St. Louis & Western	451	261,070	37,864	317,747	28,282	43,244	5,752	107,621	9,742	194,642	123,105	.....	12,000	111,105	—10,605
Western Ry. of Alabama	133	56,107	40,690	104,153	15,440	16,441	5,315	26,174	5,448	68,817	35,336	—386	3,766	31,184	13,367
SIX MONTHS OF FISCAL YEAR.															
Ann Arbor	301	$589,485	$270,768	$929,416	$142,554	$109,795	$25,359	$309,458	$25,389	$612,555	$316,861	$10,226	$73,983	$253,104	$32,486
Buffalo & Susquehanna	361	1,087,867	128,382	1,258,423	215,850	322,733	12,630	461,646	47,286	1,060,145	198,278	—161	24,000	174,117	—40,022
Canadian Pacific lines in Maine	233	265,855	127,250	439,610	123,742	71,846	27,700	196,126	16,927	436,341	3,269	.....	30,000	—26,731	—19,522
Charleston & Western Carolina	340	574,035	174,274	790,817	178,872	98,244	18,285	259,954	21,261	576,616	214,201	.....	26,850	187,351	36,660
Chicago & Alton	998	4,405,380	2,255,020	7,199,953	914,770	758,015	236,371	2,258,591	175,271	4,343,018	2,856,935	—7,956	192,000	2,656,979	—67,224
Chicago & Erie	269	1,899,807	439,657	2,547,962	320,008	526,971	92,789	1,036,708	54,516	2,030,992	516,970	.....	65,631	451,339	190,860
Chicago, Cincinnati & Louisville	284	598,874	174,564	817,218	149,733	129,831	52,091	349,234	35,683	716,572	100,646	.....	20,430	80,216	107,813
Chicago, Peoria & St. Louis	255	707,148	176,621	923,472	132,602	182,748	38,922	336,491	30,851	721,614	201,858	.....	24,900	176,958	69,900
Colorado Midland	337	922,543	223,919	1,307,578	165,196	197,424	61,978	536,405	33,170	994,173	313,405	—1,590	56,100	255,715	—24,274
Detroit, Toledo & Ironton	441	682,561	89,480	831,878	169,557	142,486	18,086	372,307	24,248	726,684	105,194	—127	39,062	66,005	—36,065
Duluth & Iron Range	168	6,296,833	133,585	6,476,335	626,378	365,242	2,094	977,920	71,992	2,043,626	4,432,709	19,718	302,295	4,150,132	1,229,263
Duluth, Missabe & Northern	289	8,697,414	215,911	8,961,675	619,443	574,726	9,219	1,100,400	80,504	2,384,292	6,577,383	32,867	444,611	6,165,639	1,598,320
Duluth, South Shore & Atlantic	600	1,087,151	544,465	1,719,742	265,138	179,130	55,780	607,323	41,812	1,149,182	570,560	8,019	116,146	462,433	158,095
Georgia	307	1,055,506	437,772	1,580,799	203,781	237,725	57,464	586,606	42,465	1,128,041	452,758	.....	12,727	440,031	179,730
Georgia Southern & Florida	395	660,240	369,200	1,185,545	123,954	235,323	33,543	413,279	50,710	856,809	328,736	6,442	52,709	282,469	46,288
Hocking Valley	350	3,293,061	487,602	3,904,224	529,332	695,996	44,913	1,029,985	70,022	2,370,248	1,533,976	86,602	129,042	1,491,536	349,680
Iowa Central	558	1,371,179	298,002	1,743,477	238,695	254,697	52,956	684,521	52,056	1,282,925	460,552	.....	44,436	416,116	101,402
Kanawha & Michigan	175	1,188,123	171,977	1,386,641	270,537	291,855	14,054	333,770	24,359	934,575	452,066	—107	41,443	410,516	162,348
Louisiana & Arkansas	225	525,571	88,774	639,083	99,777	106,120	9,599	156,096	25,863	397,455	241,628	.....	10,610	231,018	96,484
Louisiana Ry. & Nav. Co	350	504,138	98,149	670,581	138,921	76,155	29,113	268,202	32,622	545,013	125,568	.....	22,900	102,668	86,300
Louisiana Western	198	698,618	306,138	1,055,764	102,741	164,997	34,347	282,938	40,444	625,467	430,296	—1,826	35,138	393,332	—2,028
Minneapolis & St. Louis	1,027	1,800,383	698,575	2,665,952	278,747	285,507	77,892	956,439	79,700	1,678,285	987,667	—444	118,583	868,640	77,735
Missouri Pacific Ry	3,881*	7,903,240	2,050,850	10,951,197	1,617,064	1,615,959	270,927	4,144,323	282,291	7,930,564	3,020,633	—15,263	381,904	2,623,466	.....
New York, Ontario & Western	546	3,247,958	1,008,690	4,449,259	581,765	659,627	68,712	1,576,888	100,828	2,987,820	1,461,439	—18,171	100,000	1,343,268	1,900
New York, Susquehanna & Western	151	880,644	336,137	1,361,289	174,702	130,243	8,857	493,260	23,020	830,082	531,207	—33,622	67,900	429,085	13,829
Northern Pacific	5,838†	24,848,523	12,923,812	40,071,710	5,343,787	4,650,243	498,562	11,760,913	551,871	22,805,376	17,266,334	561,338	1,522,725	16,304,947	—768,801
Pittsburgh Shawmut & Northern	240	516,083	60,138	586,601	84,074	149,881	6,384	184,009	19,807	444,155	142,446	.....	9,433	133,013	142,870
St. Joseph & Grand Island	319	575,909	222,755	864,592	199,939	93,029	38,317	321,497	27,570	680,352	184,240	97	33,808	150,529	—151,712
St. Louis, Brownsville & Mexico	455	444,050	219,898	706,621	188,022	63,379	15,333	241,054	38,966	546,754	159,867	.....	19,000	140,867	34,090
St. Louis, Iron Mtn. & Southern	2,610	9,620,494	2,715,392	13,373,679	1,926,007	1,838,193	324,544	3,967,998	401,165	8,457,907	4,915,772	—25,969	423,706	4,466,097	657,372
Santa Fe, Prescott & Phoenix	257	499,359	173,226	716,659	113,739	54,320	16,677	181,443	31,077	397,256	319,403	.....	184	319,219	18,825
Spokane, Portland & Seattle	420‡	1,224,218	408,304	1,694,647	277,305	147,598	18,846	550,781	37,537	1,032,067	662,580	—9,183	174,510	478,887	385,348
Texas Central	268	314,914	198,502	555,044	103,270	76,628	9,815	170,500	23,231	383,444	171,600	.....	18,114	153,486	—75,063
Toledo, Peoria & Western	248	347,052	218,738	597,060	106,028	98,898	13,264	206,182	19,052	443,424	153,636	.....	25,000	128,636	13,948
Toledo, St. Louis & Western	451	1,607,516	251,041	1,975,869	227,511	279,027	38,952	602,221	51,554	1,199,265	776,604	.....	72,000	704,604	80,922
Western Ry. of Alabama	133	330,165	217,494	593,738	94,511	101,613	31,458	152,936	29,255	409,773	183,965	—2,353	22,873	158,739	33,099

* Began operations August 9, 1909; succeeding Missouri Pacific Ry. and Branches, and Central Branch Ry. † Mileage operated on December 31, 1908, 5,681. ‡ Mileage operated on December 31, 1908, 272. —Indicates Deficits, Losses and Decreases.

Harriman Lines Merger Hearing.

John A. Munroe, freight traffic manager of the Union Pacific, with office at Omaha, Neb., testifying in the Harriman merger case, said that he had been connected with Union Pacific since 1882.

As the result of a controversy between the Oregon Short Line and receivers of the Union Pacific as to the division of revenue, the Oregon Short Line in 1897 threatened to open the Ogden gateway to the Rio Grande. The receivers of the Union Pacific decided that the demands of the Oregon Short Line were excessive and would not comply with them. As a result the Union Pacific installed a special train to serve Portland via the Central Pacific and Shasta routes, this train running three times a week. It was taken off, however, as an impracticable venture, after the settlement of the difference with Oregon Short Line some 90 days later.

During his connection with the Oregon Short Line proper and Union Pacific between 1886 and 1897, Mr. Munroe said, there was almost no attempt to route business over the Short Line and Navigation Line to San Francisco via Portland, chiefly because the line to Portland itself is as long as the line through to San Francisco over the Central Pacific.

Mr. Munroe said that, aside from the prohibitively longer haul to San Francisco via Portland, there was the fact that any inducements, such as change of rates, absolutely necessary to open the Frisco route via Portland would have been suicidal. Southern Pacific would have deflected business from Union Pacific to the Denver & Rio Grande, and in such bulk as to have brought Union Pacific to terms.

Shortly after the rails were connected between Denver and Fort Worth, early in 1889, the Union Pacific consolidated with this line several of its branches, including that from Julesburg to La Salle, forming the Union Pacific, Denver & Gulf line, succeeded by the Colorado & Southern in 1893. Business has been and is accepted over this route, although the Council Bluffs gateway to Denver, a 569-mile line, or the Kansas City gateway to Denver, a 640-mile line, were worked preferentially, both yielding a much greater net return than the line via the Southern Pacific's Morgan steamship service to New Orleans and rails to Fort Worth, then to Denver.

In 1905 Union Pacific found it essential to open a rail and water route to Denver. From Savannah the Central of Georgia was used to Birmingham, then the 'Frisco system to Kansas City. This arrangement worked well until the 'Frisco notified Union Pacific that its relations with the Rock Island system necessitated giving the latter preference as to connections as against Union Pacific. Thereupon Union Pacific officials cast about for a new eastern connection, and made arrangements via Norfolk over the Norfolk & Western and connections.

On cross examination witness stated that rates appearing in the Transcontinental Bureau tariff sheets are largely made in conferences of representatives of lines west of the Missouri, whose acts are concurred in by eastern connections. In the matter of California rates Union Pacific would accord with Southern Pacific, and with Atchison on traffic out of Chicago. Union Pacific works the San Pedro to southern California points preferentially. Mr. Munroe said that this was not in competition with Southern Pacific, but with other lines, Southern Pacific being a virtual partner with Union Pacific in seeking this business. Mr. Munroe said that the division of revenue on through business to San Francisco, 54 per cent. to Union Pacific and 46 per cent. to Southern Pacific, was fairly justified by the Union's grade difficulties in Wyoming, which largely offset Southern's over the Sierras.

On direct examination, conducted by N. H. Loomis, general solicitor of the Union Pacific, Mr. Munroe stated that prior to 1901 the San Pedro not being in operation, Union Pacific worked all California business in conjunction with Southern Pacific, which was in a position to make rates to California, irrespective of the extent or position of other lines west of the Missouri. On cross examination by Mr. Severance, Mr. Munroe insisted that the reason for not attempting to open the Portland route to California points was not that arrangements with the Southern Pacific were satisfactory, but that the attempt to open the Portland route would ultimately have cost the Union Pacific an impossible amount. Otherwise, witness declared, the Portland route would have been opened in a moment.

Government's counsel asked whether the opening of the Portland route, which must have resulted, as witness testified, in a general rate war, would not have meant great loss to Southern Pacific on the large tonnage over the Sunset route, and whether this was not a club in the hands of Union Pacific over Southern Pacific.

Witness answered that it was a club over Southern Pacific, but a heavier one over Union. "It was a club," said Mr. Munroe, "in the same sense that I may hold a razor which enables me to commit suicide."

"Couldn't you slash the other man first?"

"Yes. He'd be slashed and I'd be dead."

Julius Kruttschnitt, vice-president of the Union and Southern Pacific lines and director of maintenance and operation of the merged lines, told at length of the improvement in the two roads since the merger. His testimony tended to show that far from being in restraint of trade, as is held by the government, the merger had stimulated commerce and had been the means of affording greater facilities for transportation across the continent.

Mr. Kruttschnitt said that in consequence of the work done in the last eight years to improve the system which he represents it is to-day in the highest state of efficiency. He testified that prior to the merger of 1901 the Southern Pacific as compared with the Union was in poor condition. Since then vast improvements had been made in rolling stock, rails and roadbed.

Improvements on Union Pacific and Southern Pacific from 1901 to 1909 were as follows:

On Union Pacific new locomotives to the number of 522; freight cars, 12,499; new steel rails laid, 2,428 miles; ties renewed, 17,220,000, equivalent to 6,146 miles; track ballasted, 1,455 miles; wooden bridges replaced, 88,256 lineal feet; iron and concrete bridges installed, 54,398 lineal feet.

On Southern Pacific, new locomotives, 920; passenger cars, 881; freight cars, 26,471; new steel rails, 3,970 miles; cross ties renewed, 24,372,000, equivalent to 8,555 miles of track; new sidings, 1,231 miles; old sidings taken up, 269 miles; wooden bridges repplaced, 136,411 lineal feet; iron and concrete bridges installed, 49,826 lineal feet.

Mr. Kruttschnitt stated that passenger service on the Sunset Route is fully up to that on the Union Pacific save as to frequency.

By reason of heavier locomotives and longer trains the Union and Southern Pacific ran their freight trains in 1909 at an average speed of 16.8 miles per hour, exclusive of stops, against 17.2 miles per hour in 1902, despite the great increase in traffic, which would otherwise have increased the number of trains and meeting points to an extent prohibitive of any movement on a single-track line.

On the Union Pacific line between Omaha and Ogden traffic density increased 180 per cent. between 1896 and 1909. During this period train density (the number of trains moved) increased only 80 per cent., due to the heavier car and train loading. For the same reason meeting points increased only 230 per cent. as against 680 per cent., which would have been the increase in difficulty of moving trains had there been no increase in train capacity. Explaining the increase in time in the freight train schedules between Council Bluffs and Ogden, which was 60 hours and 30 minutes in 1901, and 100 hours and 45 minutes in 1907 and since, Mr. Kruttschnitt pointed out that the company had increased its train load greatly and had done all possible to expedite the movement of traffic which had grown so decidedly in volume.

He said that the schedules of earlier years were not taken seriously, and that the schedules of recent years are the best possible service that can be given under the conditions, keeping in mind the increase in the price of labor and materials and the inability to increase rates. Mr. Kruttschnitt pointed out that the public had received a $154,000,000 bonus in the form of saving in cost of transportation, which has not advanced with wages and other prices, a decided offset to the increased freight train schedules.

Mr. Kruttschnitt stated that Union Pacific's average freight train speed between Council Bluffs and Ogden, which is 10 miles per hour, including stops, is a notably creditable per-

Western Ry. of Alabama: * Began operations August 9, 1909; succeeding Missouri Pacific Ry. and Branches, and Central Branch Ry. † Mileage operated on December 31, 1908, 272. Indicates Deficits. Losses and Decreases.

formance, considering the 8,000-ft. rise over the Rockies, as against the 15 miles per hour running time of the New York Central between New York and Chicago with level route and double or even quadruple tracks. Witness stated that 60 per cent. of the Union Pacific's line to Ogden is still single track. He also pointed out the retarding effect on freight movement of Federal laws regulating the continuous time crews may be kept at work, the inspection of cars, etc. In comparison with an average movement of 22.1 miles per day for all freight trains in the United States on the Union Pacific between Council Bluffs and Ogden, the average movement per freight train per day during 1909 was 41 miles, as against 32.7 miles on the Southern Pacific lines west of El Paso and 22.9 miles east of El Paso.

Mr. Kruttschnitt stated that the chief reason for the poorer showing on the Southern Pacific is the fact that it has four tidewater terminals, which he characterized as the graveyards of freight cars, shippers being allowed to keep goods in cars at tidewater a much longer period than elsewhere.

Mr. Kruttschnitt said that the passenger service has been greatly improved on the Sunset route since 1901. By transferring the terminus from New Orleans to Galveston the Sunset's freight service was greatly improved, owing to the better dock facilities, which expedited the exchange of freight.

During June and July of 1900 average time on Sunset route from New York to San Francisco for freight cargoes was 15 days and 7 hours, and in 1909 15 days and 5 hours. Via the Union Pacific the average time consumed in hauling freight from New York to San Francisco was 13 days.

The abandoned Algiers docks at New Orleans had a capacity of four steamers and 248 freight cars, as against a capacity of 14 steamers and 1,225 cars of the new docks at Galveston.

In 1900 steamers of the Sunset route had a gross tonnage of 43,478 tons against 87,968 tons in 1909, shortly to be increased to 113,568 tons by the addition of four large steamers now building. The older vessels were 12½ knot steamers, and averaged 160 hours between New York and Galveston, compared with 120 hours required by the latest seven ships, which have a speed of 16 knots. Since 1901 the tonnage added represented an expenditure of $8,782,000. Three large modern passenger steamers, 16 knot, were added to the Sunset service, New York to Galveston, in 1906 and 1907.

Comparing the elevations and curvatures to be overcome in moving freight from Portland to Ogden via Roseville, Cal., and Huntington, Ore., Mr. Kruttschnitt submitted evidence showing that the route from Portland to Granger, Wyo., via Huntington, Ore., as compared with that via Roseville, had an excess of 19,324 ft. rise and fall, 50,313 degs. of curvature, 542 miles actual distance, but that because of sharper grades via Roseville the cost of hauling one ton of freight that way is $5.94 against $2.75 per ton via Huntington.

On cross examination by Frank B. Kellogg, special counsel for the government, Mr. Kruttschnitt stated that from 1902 to 1907 many of the railways of the country expended large sums of money improving their property.

Asked regarding certain sums said to have been spent by the Pennsylvania and B. & O. in this period, Mr. Kruttschnitt disclaimed knowledge of the extent of expenditures on these lines. In comparison with an expenditure of $128,000,000 by the Atchison, witness said that Southern Pacific had spent over $250,000,000. Denying that he knew that all the railways of the country had made large expenditures for improvements since 1902 Mr. Kruttschnitt declared that he knew that a great many had not.

Asked why he selected 1897 as the first year in making the comparison with 1908, showing an increase of 17 per cent. in wages paid by Union Pacific on all classes of labor, witness repeated that the figures were those previously compiled for another case, the Salt Lake case, in which the railway was asked to show why certain rates were not too high and that that year was chosen because it showed the lowest point in the scale of prices after 1890. Questioned whether he thought there should be the same percentage increase in gross revenue from rates as in cost of labor and materials, Mr. Kruttschnitt said:

"No, railway men have come to expect so little that naturally I would not think that." Witness said that he did think, however, that there should be an increase in rates to somewhat offset the increased cost of operation.

Asked whether he considered 10 per cent. a reasonable dividend rate, Mr. Kruttschnitt said: "Yes. In comparison with 12 per cent. to 15 per cent. paid by banks, a 12 per cent. and 13 per cent. return on farm values, I do not think that a 10 per cent. dividend on a railway stock, only 6 per cent. of which represents railway earnings proper, the other 4 per cent. being a return on investments, as at all excessive."

Mr. Kellogg called attention to the increase in net earnings of the Union Pacific system from approximately $13,000,000 in 1899 to $38,234,814 in 1909, fiscal year. Explaining the decrease in the operating ratio from 57 per cent. in 1899 fiscal year to 47 per cent. in 1909, Mr. Kruttschnitt pointed out that in 1908 the operating ratio or proportion of gross expended in operation was 54 per cent. In the fiscal year ended June 30, 1909, all railways were still skimping expenses.

Witness agreed that in 1909 Union Pacific's gross earnings were more than double those of 1899, and that the expenditures for grade and curve elimination, ballasting and the best of equipment had been made to increase net under unchanged rates.

Q. "You did not make these expenditures for charity then?"

A. "No. But as it turned out they enabled us to be very charitable indeed, the railways bearing the brunt of the 1907 panic, the Union and Southern Pacific alone benefiting the public to the extent of $154,000,000, paid out as increase in wages and cost of materials without any increase of rates."

Counsel for government emphasized the importance of reduction of 90 miles in distance between Council Bluffs and San Francisco since 1901, elimination of grades and curvatures, and increase of traction power, as regards running time. Witness stated that no man could keep running time of trains nine years ago at his command, but was perfectly willing to have schedules prepared.

Mr. Kruttschnitt stated that he did know that the passenger service at present is highly satisfactory to the public, and with that condition achieved he did not concern himself with ancient history.

Mr. Kruttschnitt under cross examination said that the 100-hour freight train between Council Bluffs and Ogden had been on time 89 per cent. over a long period of time of its runs, and that Salt Lake merchants in large majority were on record as perfectly satisfied with this service.

Asked whether the law had not increased the period during which live stock may be carried without watering, from 28 to 36 hours, tending to decrease delay due to government regulation, Mr. Kruttschnitt stated that there were provisos which made it dangerous for the company to take advantage of this additional eight hours. Witness called attention to the fact that federal regulation of inspection has added six hours and six minutes since 1901 to the running time between Council Bluffs and San Francisco.

Referring to the increase of 89 per cent. in taxes on the Union Pacific between 1901 and 1909, Mr. Kruttschnitt stated that there had undoubtedly been an increase in the value of the property, but he could not undertake to say whether it had been proportionate to the tax increase. Between 1899 and

NEW YORK CITY RAILWAYS EARNINGS IN THE THREE MONTHS ENDED SEPTEMBER 30.

	Total operating revenue.		Total operating expenses.		Operating income.		Net corporate income.	
	1909.	1908.	1909.	1908.	1909.	1908.	1909.	1908.
Hudson & Manhattan	$374,400	$128,607	$196,097	$134,239	$325,267	$97,985	†$17,513	†$60,009
Interborough Rapid Transit, Elev. Div.	3,469,627	.....	1,445,487	.....	*1,620,486	.....	.....	.....
Interborough Rapid Transit, Subway Div.	2,826,941	.....	1,086,910	.....	*1,685,811	.....	.....	.....
Both divisions	.....	5,507,316	.....	2,675,710	.....	2,433,980	*787,629	91,189
Brooklyn Rapid Transit	5,773,539	5,165,990	3,239,020	3,085,552	2,207,380	1,851,520	766,648	618,088
Metropolitan Street Railway System	3,743,739	3,609,953	2,391,339	3,343,252	1,004,392	†107,831	378,765	†608,077
Third Avenue System	2,107,329	1,864,956	1,148,281	1,258,997	867,112	537,957	660,795	330,250

*Subject to deduction for depreciation of way and structures and equipment, which was not charged to operating expenses. †Deficit.

1908 the capital invested in railways in the United States increased 52 per cent.

Mr. Kruttschnitt declared that he was unable to see the relation of the magnitude of the dividend rate to the subject of freight tariffs as regards one or two lines, since any reduction in freight rates on Union and Southern Pacific would simply crowd their lines with business and bankrupt other roads.

At this point Mr. Kruttschnitt's testimony was concluded, and Vice-President A. L. Mohler, general manager of the Union Pacific, was sworn.

Mr. Mohler, under direct examination by N. H. Loomis, counsel for the Union Pacific, enumerated the changes of line made on the Union Pacific after its acquisition by the present management. Over 150 miles of the old line were abandoned and 188 miles reconstructed. Two tunnels were bored; the Aspen tunnel, 6,100 ft. long, and the Sherman tunnel, 1,800 ft. long on top of the Rockies, reducing the highest elevation of the Union Pacific. at Sherman, to 8,011 ft., a saving of 247 ft.

Mr. Mohler cited extensions of the Union and the growth of the double-track from 69 miles in 1900 to 459 miles now in operation, beside which 226 miles are under actual construction, it being absolutely necessary to double-track the main line as rapidly as possible. Block signals are in operation over the entire line from Council Bluffs to Ogden, and to Denver, and from Kansas City to Topeka, while additional mileage under block signals is being added rapidly between Topeka and Salina, Kan., and between La Salle, Colo., and Cheyenne, Wyo.

Mr. Mohler stated that the block signal system costs the company about $225,000 annually, the average cost for operation being $80 per signal per annum, Union Pacific having 1,459 miles of electrically guarded road in operation.

At the present time 45.36 per cent. of the company's freight equipment is steel or steel underframes. Beginning with 1906, over 80 steel passenger cars have been purchased. In 1907 orders were given that all passenger equipment procured should thereafter be of steel, this type costing 50 per cent. more and adding nothing to revenue, but being a safeguard against injury of passengers. Traction power has been increased 39 per cent. since 1901; the observation car equipment has been increased twelvefold, and the number of dining cars from ten to forty.

Ton-mileage between Council Bluffs and Ogden increased 113 per cent. between 1900 and 1909. Passenger train mileage during the same period increased 69.5 per cent., and the number of passenger trains per day from 7.31 in 1900 to 12.38 in 1909, or 68 per cent. This increase in traffic compelled a slowing down in the schedules of trains, increasing the number of meeting points.

Mr. Mohler testified that the train dispatchers' sheets for 1900 to 1903, taking random dates in June and October as the lightest and heaviest traffic months, show that the fast freight train, with a 54 hour and 30 minute schedule, consumed anywhere from 58 to 108 hours in 1900, 65 to 129 hours in 1901 and 78 to 108 hours in 1903 for the run from Council Bluffs to Ogden. The schedule was lengthened to 58 hours, 25 minutes in 1901, 64 hours in 1902 and 101 hours in 1907.

Commenting on the greater difficulties to be met in operating the Union Pacific as compared with eastern lines, Mr. Mohler pointed out that in the first 500 miles out of Council Bluffs Union Pacific trains have to be lifted over 1¼ miles.

In 1901 Union Pacific moved a few cars faster and many slower than at present, the officials having endeavored to remove a great deal of discrimination, with the effect that all freight between Council Bluffs and Ogden moved at the rate of 41.5 miles per day between January, 1907, and February, 1909, against 26.7 miles on the Santa Fe from Chicago to Kansas City, Denver and Albuquerque; 21.5 miles over Great Northern, St. Paul to Seattle; 21.4 miles over Northern Pacific, St. Paul to Portland; 29.6 miles over Burlington, Chicago to Denver; 24.7 miles over the St. Paul, Chicago to Seattle; 23.9 miles over Pennsylvania and 25.2 miles over the New York Central, New York to Chicago.

On cross-examination by Mr. Severance, Mr. Mohler agreed that shortening the Council Bluffs-Ogden line 40 miles, eliminating grades and curvatures and adding double track had a general effect of expediting operation, but that all of the improvements made to a recent date had been absorbed in the more than proportionate increase of traffic. The chief reason that the Kansas City-Denver line is not being double tracked is that a cut-off to the main line has been developed by building from Menoken to Marysville, Kan., where connection is made with the St. Joseph & Grand Island, over which traffic runs to Grand Island on the main division. This shortens the line between Kansas City and Cheyenne 120 miles, as compared with the Kansas City-Denver-Cheyenne route.

The Possible Strike of Coal Miners.

A man who is in very close touch with the coal trade tells the *Railway Age Gazette* that owing to various circumstances a strike of the United Mine Workers of America on April 1 is not improbable. He sums up the situation as follows:

Owing to the severe weather of the last few months the railways have been unable to haul the usual amount of coal to the markets. The consequence is that the amount in storage is much smaller than usual at this time. The retail coal dealer, the manufacturer and the railway are about out of coal. The western railways, for example, usually supply their own demands from mines along their lines, but several roads have recently bought large quantities of coal in Pennsylvania which must yet be hauled to them. In order to accumulate supplies of coal before April 1, when the contracts of the operators with the mine workers will expire, it will be necessary for the railways to haul much more coal than they usually do in the same length of time. The mine workers know the situation and are showing a strong disposition to take advantage of it. They have asked for an advance in wages of 10 cents a ton for pick-mining coal and a corresponding advance in wages for mining coal which is produced by machinery.

The miners in Ohio apparently hold the key to the situation. The mines in that state are operated by union labor. The mines in West Virginia are operated by non-union labor. The mine operators of Ohio say that they cannot increase wages and compete with the operators in West Virginia unless the latter also raise wages, and the latter are so situated that it may not be necessary for them to raise wages. The consequence would be that the mine operators of Ohio would have to refuse an advance. At the last meeting of the United Mine Workers of America at Indianapolis it was agreed that no settlement with the operators in any district would be made unless the same settlement was made with them in all districts, the districts usually being states. Consequently if no settlement should be reached in Ohio none could be made anywhere else, and a general strike would result. It is less than 40 days until the question of wages in the coal fields must be settled.

Advance in Coal Rates in Illinois.

The railways hauling coal from Illinois mines to Chicago have decided to raise the rates, effective April 1, an average of 10 cents a ton. The advances from the various groups of mines are shown by the following figures, giving the new and the old rates:

	Old.	New.		Old.	New.
Harrisburg	$.95	$1.07	Danville	.67	.77
Carterville	.98	1.10	Clinton	.70	.80
Springfield	.75	.85	Brazil	.70	.80
Northern Illinois	.50	.60	Linton	.80	.88
Fulton County	.65	.75			

The coal traffic is an important item in the traffic of the roads affected. The quantity hauled from the Illinois mines to Chicago in the nine months ended June 30, 1909, was 8,000,000 tons. The rates above given are those from the various groups of mines to Chicago. Similar advances will be made from other points in northern Illinois.

INTERSTATE COMMERCE COMMISSION.

Rules providing for demurrage and storage charges at New Orleans on shipments of forest products shipped on local bills of lading "for export" after ten days of free time, the same as on other commodities shipped under like conditions, is found by the Interstate Commerce Commission to be neither

unlawful nor unreasonable, nor unjustly discriminatory as compared with rules which do not provide for demurrage or storage charges on shipments that are moved under through export bills of lading. (17 I. C. C., 496.)

Service performed by a private railway within an industrial plant is held by the Interstate Commerce Commission to be a plant facility. It further is held that the expense of operating such a line must be borne entirely by the owners of the manufacturing or industrial plant, and that no rail way under the guise of the absorption of a switching charge may lawfully sustain the private road. (17 I. C. C., 514.)

Rates on Colorado Coal Reduced.

Cedar Hill Coal & Coke Co. et al. v. Colorado & Southern et al. Opinion by Commissioner Clements.

Complainants are engaged in the operation of coal mines in southern Colorado in what is known as the Walsenburg district, located along the lines of the Colorado & Southern and the Denver & Rio Grande. This district is about 44 miles south of Pueblo, and extends north and south about 15 miles.

The defendants admit that there are no joint through rates on coal from complainants' mines to points on the Santa Fe. Neither do we understand that any serious claim is made that the present arrangement by which through billing is denied and rebilling is required at junction points constitutes a "reasonable or satisfactory" through route.

In the opinion of the commission the record in these cases shows that no reasonable or satisfactory through routes exist for this traffic except to certain points reached by other carriers where there are joint rates in effect; leaving out these points, an order will be issued requiring the establishment of through routes from the complainants' mines to points on the lines of the defendant carriers as petitioned for in each of these complaints. That is, joint through routes from complainants' mines in the Walsenburg district, to points in Texas and New Mexico, on the Southern Kansas, Eastern of New Mexico, Pecos & Northern Texas, and Pecos River Railroad, via the Colorado & Southern to Texline, Tex., and the Fort Worth & Denver City to Amarillo, Tex.; joint through routes from complainants' mines to points on the Santa Fe and the Eastern Railway Company of New Mexico in New Mexico and Texas, via Trinidad, Colo.; joint through routes from complainants' mines to points on the line of the Santa Fe in Kansas, via Pueblo, Colo. There will be excepted certain points which already have through routes and joint rates over the lines of other carriers, and no points in Oklahoma will be included, as the record is not conclusive as to whether those points should be reached via the Amarillo gateway or via Pueblo.

The complainants include in their petition figures showing what they conceive to be the proper joint rates on this traffic. The following table gives the absolute rate and the per-ton-per-mile rate from Walsenburg and from Cañon City to representative points throughout the markets covered by the petition. There are also shown the rates asked for in the petition.

After careful consideration of all the facts, circumstances and conditions bearing upon the questions involved, we conclude that joint rates should be accorded by defendants on coal from the Walsenburg district to points on the Santa Fe lines in Kansas, and those points in Texas east of but not including Joel, which should not exceed those shown in schedules on file of rates between Cañon City, Colo., and those points, and referred to by tariff number in the order. To points in Texas and New Mexico west of and including Joel, Tex., but not including points in New Mexico on the line running north of Belen, we find that the rates should not exceed the rates to these points from Trinidad, Colo., shown in tariff schedules specifically referred to in the order, plus a differential of 30 cents per ton; while to points north of Belen the rates should not exceed the rates to said points from Trinidad, Colo., shown in tariff schedules specifically referred to in the order, plus a differential of 25 cents per ton. These differentials are the same as those maintained generally by the defendants in corresponding territory where they have rates from both Cañon City and Trinidad.

Rate on Coal, Per Ton of 2,000 Pounds.

To—	1. From Walsenburg district via Amarillo.	2. Distance	3. Rate per ton per mile.	4. From Cañon City district.	5. Distance.	6. Rate per ton per mile.	7. Rates asked from Walsenburg.	8. Distance.	9. Rates asked per ton per mile.
Panhandle, Texas	$6.60	358	$0.0184	$3.60	737	$0.0049	$3.10	358	$0.0086
Plainview, Texas	6.80	370	.0183	3.80	839	.0045	3.40	370	.0092
Roswell, N. Mex	11.60	497	.0233	4.35	976	.0045	3.50	497	.0070
Artesia, N. Mex	11.60	549	.0211	4.60	1,018	.0045	3.75	549	.0069
Pecos, Texas	9.80	671	.0146	5.05	1,140	.0044	4.20	671	.0063
Garden City, Kan.	.....	...	.....	2.75, 2.25*	597	.0046, .0038*	2.50	613	.0040
Emporia, Kan.	.....	...	.....	3.50	533	.0065	3.25	549	.0059
Kansas City, Mo.	.....	...	.....	3.75	646	.0058	3.50	642	.0054
Guthrie, Okla.	.....	...	.....	3.25	627	.0051	....	...	.....

*Nut.

STATE COMMISSIONS.

The Railroad Commission of Louisiana proposes to amend its Order No. 781, applying on household goods and immigrants movables, so as to provide that in case of loss or damage the carrier's liability shall be limited to $10 per 100 lbs. on household goods instead of $5, as now provided.

The Railroad Commission of Louisiana proposes to adopt an order requiring that all second-hand machinery to be used for building or reconstruction purposes shall be transported between points within the state at one-half the regular tariff rates applying on new machinery, except in cases where special commodity tariffs now in effect carry a lower rate.

COURT NEWS.

The federal court at Springfield, Ill., has issued an injunction restraining the attorney-general of Illinois and the various state's attorneys from interfering with the Chicago, Peoria & St. Louis raising its passenger fare from 2 cents to 3 cents a mile. An amended petition filed by the receivers, John P. Ramsey and Henry M. Merriam, states that the value of the property used for passenger business in Illinois during the period from July 1, 1907, to June 30, 1909, was $800,000, and that a reasonable return on its value would be at least $48,000 a year. The total earnings from passenger service during this period are given at $510,230, and the expenses incident to the service, including no fixed charges except taxes, as $520,121, leaving a deficit of $9,890.

The Supreme Court of the United States has sustained the Supreme Court of South Carolina in holding that the law requiring railways to pay a penalty of $50 for failure to adjust claims for losses within 90 days is valid, as applied to intrastate traffic only.

Reversing the decision of the Supreme Court of Alabama, the Supreme Court holds unconstitutional, as applied to the Southern Railway, the Alabama statute levying an annual franchise tax on foreign corporations doing business in the state. The court held the act to be an improper discrimination against foreign corporations. The same decision was given in the suits of the Louisville & Nashville and other roads for the recovery of taxes paid under the law.

In a suit of the state of Kansas against the Missouri Pacific the Supreme Court sustains the right of the state railroad commissioners to compel the road to run a passenger train on the Madison branch, where only mixed trains were run, notwithstanding the fact that the operation of the train might prove unprofitable. The decision was by Justice White. The railway, in its defense, claimed that if the deficit from the operation of an unprofitable branch were to be met by using the profits arising from business on other parts of the line, the property of the road would be taken by the state in violation of the constitution.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Charles Ehlers has been appointed auditor of the Mississippi Central, with office at Hattiesburg, Miss., succeeding W. L. Greenhalgh, resigned to accept service elsewhere.

L. S. Price, Jr., has been appointed assistant secretary and assistant treasurer of the Gulf Line, with office at Sylvester, Ga., succeeding C. H. Reynolds, resigned to go to another company.

George A. Kyle, chief engineer of the Oregon Trunk Railway at The Dalles, Ore., has been elected vice-president, with office at Portland, Ore., succeeding Jackson Smith, deceased. Ralph Budd, formerly engineer maintenance of way and bridges and buildings of the Panama Railroad at Colon, Panama, succeeds Mr. Kyle.

Operating Officers.

R. Emerson, assistant to general manager of the Lehigh Valley at South Bethlehem, Pa., has resigned, to go to the Atchison, Topeka & Santa Fe.

R. W. Edwards has been appointed superintendent of terminals of the Kansas City Southern at Kansas City, Mo., succeeding W. J. Donovan, resigned to engage in other business.

P. Sorenson has been appointed an assistant superintendent of the Montana division of the Oregon Short Line, with office at Pocatello, Idaho, succeeding T. W. Jackman, assigned to other duties.

P. H. McFadden, general roadmaster of the Grand Trunk Pacific at Melville, Sask., has been appointed superintendent of the Prairie division, with office at Melville, succeeding W. C. C. Mehan, transferred, and the office of general roadmaster is abolished.

Paul A. Hewitt, auditor of the Cleveland, Cincinnati, Chicago & St. Louis, the Cincinnati Northern and the Peoria & Eastern at Cincinnati, Ohio, has been appointed manager of the Central Railway Clearing House, with office at Buffalo, N. Y., succeeding Ernest F. Haubold, transferred.

R. R. Auerbach, roadmaster of the Second district, Montana division, of the Northern Pacific at Livingston, Mont., has been appointed trainmaster of the First district, with office at Livingston, succeeding C. E. Shepard, granted an indefinite leave of absence. A. Larson succeeds Mr. Auerbach, with office at Livingston.

C. T. Mason, assistant superintendent on the Birmingham sub-division of the St. Louis & San Francisco at Birmingham, Ala., has been appointed assistant superintendent on the Tupelo sub-division, with office at Amory, Miss. J. F. Liston, trainmaster of the Birmingham terminals and the Bessemer branch, suceeds Mr. Mason, and F. J. Lee succeeds Mr. Liston.

Bushrod W. Taylor, superintendent of the Louisville division of the Pennsylvania Lines West of Pittsburgh at Louisville, Ky., has been appointed a general agent operating department of the Pittsburgh, Cincinnati, Chicago & St. Louis, with office at Louisville. F. J. Kron, superintendent on the Northwest system at Cambridge, Ohio, succeeds Mr. Taylor, with office at Louisville, and J. C. McCullough, trainmaster at Pittsburgh, Pa., succeeds Mr. Kron, effective March 1.

Traffic Officers.

Thomas F. Farmer has been appointed a commercial agent of the Texas Central, with office at Waco, Tex.

G. C. Brown has been appointed a commercial agent of the Chicago Great Western, with office at Cleveland, Ohio.

John F. Ryan has been appointed a traveling freight agent of the New Orleans, Mobile & Chicago, with office at Memphis, Tenn.

E. W. Schneider has been appointed a contracting freight agent of the New York Central Lines, with office at Salt Lake City, Utah.

G. W. Boogher, traveling agent for the Chicago & North Western, with office at St. Louis, Mo., has resigned to engage in other business.

James M. Seibert, statistician of the Missouri Pacific-Iron Mountain system, has been appointed general agent in the passenger department, with office at St. Louis, Mo.

R. A. Belding, general agent in the freight department of the Chicago Great Western, with office in New York, has been appointed an assistant general freight agent in New York.

G. F. Herr, general Pacific coast agent of the El Paso & Southwestern at San Francisco, Cal., has been appointed general agent of the Denver & Rio Grande, with office at Los Angeles, Cal., succeeding S. C. Nash.

W. C. Connor, Jr., general freight and passenger agent of the Trinity & Brazos Valley at Houston, Tex., has been appointed traffic manager of the St. Louis & San Francisco lines east of Houston, with office at Houston.

W. F. Morris, Jr., traveling passenger agent of the Great Northern at Pittsburgh, Pa., has been appointed a traveling freight agent, with office at Buffalo, N. Y., succeeding P. E. Meaney, transfered to Milwaukee, Wis., as general agent.

J. L. Martin, freight agent of the Asheville lines of the Southern Railway at Louisville, Ky., has been appointed a traveling freight agent of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern, with office at Atlanta, Ga.

General agents have been appointed in the passenger department, Atlantic service of the Canadian Pacific's steamship lines, as follows: H. M. MacCallum, with office at Chicago; S. J. Sharp, with office at Winnipeg, Man., and I E. Suckling, with office at Toronto, Ont., effective March 1.

Engineering and Rolling Stock Officers.

The title of W. L. Ekin, engineer of maintenance-of-way of the Michigan division of the Vandalia at Logansport, Ind., has been changed to division engineer.

J. W. Small has been appointed superintendent of machinery of the Kansas City Southern, with office at Pittsburg, Kan., succeeding F. R. Cooper, resigned.

D. M. McKenna has been appointed foreman of the car department of the International & Great Northern, with office at Palestine, Tex., succeeding W. E. Looney, resigned.

J. E. Schiller has been appointed a roadmaster on the Minidoka Roadmaster's District (Idaho division) of the Oregon Short Line, with office at Pocatello, Idaho, succeeding Frank McGonigle, resigned.

L. M. Perkins, division engineer of the Northern Pacific at St. Paul, Minn., has been appointed engineer of maintenance of way of the lines east of Paradise, Mont., with office at St. Paul, succeeding W. C. Smith, promoted.

R. M. Conley has been appointed a road foreman on the Western division of the Western Pacific, with office at Sacramento, Cal., and W. D. Gillott has been appointed a road foreman on the Eastern division, with office at Elko, Nev.

OBITUARY.

George W. Storer, assistant general passenger agent of the Boston & Maine at Boston, Mass., died on February 17 at his home in Arlington. Mr. Storer was born in May, 1850, at West Cambridge (now Arlington) and began railway work in February, 1867.

E. J Randall, engineer of maintenance-of-way of the Union Railroad at Port Perry, Pa., died at his home on February 11. Mr. Randall was born in 1860 and was educated in Nova Scotia. He began railway work in 1880 and served at first on the New York & New England and later on the Leavenworth, Topeka & Southwestern, and the Boston, Hoosac Tunnel & Western. In 1887 he was made assistant engineer of the Toledo, St. Louis & Kansas City, now the Toledo, St. Louis & Western, and in 1890 was appointed assistant engineer of the Denver & Rio Grande, returning two years later as engineer to the Toledo, St. Louis & Kansas City. On this road he was later engineer of maintenance-of-way and then land and tax agent. In September, 1901, he went to the Bessemer & Lake Erie as principal assistant engineer, and four years later was appointed engineer maintenance-of-way of the Union Railroad.

Railway Construction.

New Incorporations, Surveys, Etc.

Arkansas, Oklahoma & Western.—An officer writes that work is now under way in Arkansas by the W. R. Felker Construction Co., Rogers, building a connecting line about seven miles long east to a connection with the Monte Ne branch, and from the eastern terminus of that line at Monte Ne east via Canuck, thence southeast to Huntsville, 29 miles. The line will pass through a rough, mountainous country. The work includes two steel bridges, one over White river and the other over War Eagle creek. (Feb. 18, p. 379.)

Atchison, Topeka & Santa Fe.—According to press reports the branch of the Gulf, Colorado & Santa Fe that now runs from Temple, Tex., west to San Angelo, is being extended northwesterly to Sterling City, about 50 miles, thence west to Pecos, where connection is to be made with the Pecos Valley line of the Santa Fe, a total of 200 miles. Construction work is also under way on other lines in western Texas. The grade for the Texico-Coleman cut-off is finished from Coleman northwest to Sweetwater, 80 miles, and about 25 miles of track has been laid. This cut-off will be 310 miles long. Between Sweetwater and Lubbock, 125 miles, part of the grade is finished. Construction work is said to be under way on a line from this cut-off at a point about 15 miles south of Lubbock, south to Stanton, about 100 miles, thence southeast to Sterling City, an additional 75 miles. It is said that the branch now under construction from Lometa, west up the valley of the San Saba river and the Brady creek will be continued west to San Angelo, 125 miles. An officer writes that contracts are let on about 100 miles from Lometa west to Eden. According to press reports contracts have been let to the Morey-Faulhaber Construction Co., St. Louis, Mo., for the first 30 miles from Lometa west; to Levy & Owens, Galveston, Tex., for the second 30 miles, and to the C. H. Sharp Construction Co., Kansas City, Mo., for the last 40 miles. (Feb. 18, p. 379.)

This company has finished 26 miles of new double-track on the Illinois and Missouri divisions since July, 1909, and has authorized and under construction or contract 253 miles on the Illinois, Missouri and Albuquerque divisions and further west, of which 100 miles is nearing completion. It will take about one year to finish all the work. The plans provide for second track at most congested portions of the line like that between Winslow, Ariz., and Seligman, where there is a frequent meeting of freight and passenger trains. A cut-off on this section shortening the distance 12 miles, will be completed next fall. Double-tracking east of Kansas City, Mo., is nearing completion. There are stretches of second and third track between Kansas City and Newton, and the Abo Pass line which will provide two routes to Albuquerque, N. Mex.

Brownwood North & South.—This company is said to be asking bids up to March 10 for clearing and grading about 18 miles of line from Brownwood, Tex., north to May. J. J. Timmins, H. Ford and others, of Brownwood, are incorporators. John Mead, chief engineer. (Feb. 11, p. 328.)

Canadian Pacific.—The new lines to be built in western Canada during 1910 are as follows: Regina, Sask., southeast to Griffin, 73 miles, on the Weyburn-Stoughton line, it is intended ultimately to carry this line further to the southeast to a connection with the line being built westerly from Lander, Man.

Regina north to Bulyea, 50 miles; this line will give direct connection between Saskatoon and Regina, and will be built on the east side of Last Mountain lake.

Outlook, Sask., to Macklin, 147 miles; this is a section of the Moose Jaw-Lacombe line, which is finished from Moose Jaw northwest to Outlook. The extension will run west from Outlook for 93 miles, then northwesterly for 54 miles to a connection with the Saskatoon-Wetaskiwin line at Macklin station, and will provide direct connection from Moose Jaw to Edmonton, Alb.

Regina, northwest to Colonsay, 110 miles. This line will run on the west side of Last Mountain lake to a point about 40 miles east of Saskatoon, on the Pleasant Hills branch at Colonsay.

Weyburn branch, in southern Saskatchewan, has been extended west of Weyburn for 26 miles and will be further extended west for 25 miles.

A branch from Langdon, Alb., which is just east of Calgary, has been built northwards for 32 miles, and is to be extended east 30 miles into the irrigation belt.

A new line will also be built into the fall wheat district of southern Alberta. This line from Kipp, Alb., just west of Lethbridge, has already been built for 28 miles from Kipp northward to Carminigay, and is to be extended north 30 miles.

Work will also be started on the Kootenay valley line from Golden, B. C., on the main line in the Rocky mountains, south towards Fort Steel junction, on the Crow's Nest Pass, on about 20 miles. This makes a total of about 517 miles to be built this year. The company will also put up two large bridges, one over the North Saskatchewan river from Strathcona, Alb., to Edmonton, to cost $1,500,000, and the other over the South Saskatchewan river at Outlook, Sask., to cost $580,000. (Feb. 18, p. 379.)

Central Idaho.—According to press reports this company has been organized in Utah by the Oregon Short Line interests to build from Owinza station, Idaho, on the main line of the Oregon Short Line, northwest to Boise, thence via Middletown and New Plymouth to Ontario, Ore., about 220 miles. W. H. Bancroft, president; J. A. Reeves, vice-president, and G. H. Jenkinson, treasurer, all of Salt Lake City, Utah.

Chesapeake & Ohio.—Announcement is made that plans covering improvements for 1910 will call for an expenditure of about $5,000,000. Most of the money will be spent for double-tracking and other additions to facilities.

An officer writes that complete plans for a yard at Silver Grove, Ky., have not yet been finally adopted. Contracts have been let for a small portion of the grading to Langhorne & Langhorne, Lynchburg, Va. Other work recently let is as follows: Five miles of branch line on Horse creek, a branch of the Coal River line in West Virginia, to Johnson & Briggs, Richmond, Va.; an 11-mile extension of the Guyandotte Valley branch from Dingess Run to the mouth of Buffalo creek, in West Virginia, to Boxley Bros. & Frazier, Logan, W. Va.

Chicago, Burlington & Quincy.—According to press reports this company will spend a large amount of money for improvements in Wyoming and the Yellow Stone Park section. The plans provide for several new branch lines and track betterment work at a number of points. Considerable improvements are to be made in Nebraska on the Omaha and Lincoln divisions. This will include double-tracking the Omaha division between Lincoln and Waverly. Ballasting on 65 miles between O'Neill and Sioux City, and extensive bridge rebuilding and track betterment work is also to be carried out. Eighty-five miles of the main line near Lincoln will be laid with new 90-lb. rail and west of Lincoln ballasting will be carried out on 100 miles. Improvements are also to be made on the Denton cut-off, the Milford line and on several other branches. It is understood that all this work will be completed during 1910.

Chicago, Rock Island & Pacific.—An officer writes that it is the intention of the company to fully ballast the entire line between St. Louis, Mo., and Kansas City, 297 miles. The work includes widening all the embankments preparatory to ballasting, taking out sags wherever necessary, filling in all the long and high trestles and putting in reinforced concrete boxes to take care of the water-way. The company also expects to lay about 100 miles of new 85-lb. rail on this line. (Feb. 4, p. 280.)

Regarding the reports that plans are being made for a cut-off from Atlantic, Iowa, west to Council Bluffs, about 45 miles, an officer writes that he has not been officially advised that this work will be carried out. (Feb. 18, p. 379.)

Cleveland, Cincinnati, Chicago & St. Louis.—According to press reports work is to be started in June on the Evansville, Mount Carmel & Northern from Mount Carmel, Ill., south to Evansville, Ind., 43 miles. The McGarth Construction Co., it is said, will have charge of the work. (Nov. 5, p. 894.)

Columbus, Mississippi & Western Alabama.—Plans are nearing completion to build from Winfield, Ala., southwest via Vernon to Columbus, Miss., about 50 miles. The line will

provide Columbus with direct connection to the Alabama coal fields. Charles F. Sherrod, Columbus, is said to be interested. (See Alabama Roads, Dec. 10, p. 1166.)

DENVER, LARAMIE & NORTHWESTERN.—See Denver, Laramie & Northwestern Railway under Railway Financial News.

DULUTH, RAINY LAKE & WINNIPEG.—An officer writes that contracts are to be let this spring to build the Duluth, Winnipek & Pacific from Virginia, Minn., south to Duluth, 74.4 miles. Thirty miles of the work will be heavy. There will be bridges over the St. Louis, White Face, Clouquet and Midway rivers, also over a number of streets in West Duluth, and one tunnel 500 ft. long. The company also plans to put up ore docks and shops in West Duluth. (Feb. 11, p. 329.)

DULUTH, WINNIPEG & PACIFIC.—See Duluth, Rainy Lake & Winnipeg.

EVANSVILLE, MOUNT CARMEL & NORTHERN.—See Cleveland, Cincinnati, Chicago & St. Louis.

FORT SMITH & INTERURBAN.—Incorporated in Arkansas, with $100,000 capital, to build a line from Greenwood, Ark., northwest via Bonanza to Fort Smith, about 25 miles. George Sengel, president.

GAINESVILLE MIDLAND.—An officer writes that there is no truth in the press reports that this company will build an extension into North Carolina in the near future. The company has finished a preliminary survey for an extension of 50 miles north of Gainesville, Ga., to timber lands, and there is a possibility of this line being constructed during the next year.

GULF, COLORADO & SANTA FE.—See Atchison, Topeka & Santa Fe.

INTERCOLONIAL.—This company is asking for bids to build eight miles between Chatham, N. B., and Nelson.

Bids are wanted by A. W. Cambell, chairman of the Government Railways Managing Board at Ottawa, Ont., until March 15, for building a line between George's river, N. S., on the Intercolonial and Sydney Mines, 9.09 miles. Plans are at Sydney Mines and at the office of the chief engineer, Moncton, N. B.

KANAWHA & MICHIGAN.—Improvements are to be made to eliminate heavy grades and sharp curves. The work includes elevating the tracks and straightening the line at Kanauga, Ohio, on the west bank of the Ohio river opposite Point Pleasant, W. Va. The improvements will cost about $100,000. (Oct. 8, p. 661.)

KANSAS CITY, MEXICO & ORIENT.—Contracts have just been let to build the branch from San Angelo, Tex., south to Del Rio, 165 miles. Work is to be started March 1. (Jan. 14, p. 113.)

LAKE SHORE & MICHIGAN SOUTHERN.—An officer writes that such work as may be carried out during 1910 will be at various points where additional tracks are most required and will not be continuous. The work will be done by the company's own forces.

MIDLAND PENNSYLVANIA.—Incorporated in Pennsylvania, with $430,000 capital, to build from Millersburg, Dauphin county, Pa., northeast via Gratz and Gordon to Ashland, in Schuylkill county, 43 miles. W. E. Harrington, president; J. H. Williams, C. G. Shadle, H. B. Reeves, J. F. Romberger and H. J. Sulliman are directors.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Announcement is made that this company will spend $8,000,000 for improvements during 1910. Of this amount $3,000,000 is to be spent upon the Chicago division and the remaining $5,000,000 for improvement of the main line and the branch into Duluth. (Feb. 11, p. 329.)

MISSOURI, KANSAS & TEXAS.—This company has grade revision work under way on a 90-mile section between the Red river and McAlester, Okla. When the improvements are completed the total expenditure on this work will be about $5,000,000. (Aug. 6, p. 259.)

NORFOLK & WESTERN.—An officer writes that the contract has been let to Joseph H. Sands, Roanoke, Va., for all roadbed construction necessary for the low-grade cut-off around Petersburg, Va. The line is to be 8.91 miles long. (Feb. 18, p. 384.)

NORTHERN PACIFIC.—According to press reports from Tacoma, Wash., construction work will be started soon on a new water grade line from Tacoma northwest via Point Defiance and the narrows. There is to be a tunnel at Point Defiance 900 ft. long. It is said a number of changes will be made in the Tacoma yards. Peter Sims, Spokane, is to have charge of the work on a percentage basis.

OHIO ELECTRIC.—This company has given a mortgage to raise funds, part of which are to be used for extensive improvements, including double-tracking part of the line.

OKLAHOMA CITY & PAN-HANDLE.—Incorporated in Oklahoma, with $250,000 capital and headquarters at Oklahoma City, Okla. Plans call for a line from Oklahoma City southwest to the western boundary of Oklahoma, about 160 miles. The estimated cost of the line is $2,000,000. The directors include: J. B. Johnson, A. Key, S. P. Bennett, T. R. Anderson and E. J. Dupree, Oklahoma City, and H. E. Chapman, Altus.

ONTARIO ROADS.—Residents of Niagara-on-the-Lake, Ont., are interested in a project to build a line from that place south to Queenstown, about 10 miles. George Pettit, Welland, is the principal promoter.

OREGON & WASHINGTON.—Contract is said to have been given to Dibble & Hawthorne, Tacoma, Wash., for constructing yards at a point between the Northern Pacific drawbridge and the Prescott yards. (Feb. 4, p. 280.)

OREGON RAILROAD & NAVIGATION CO.—An officer writes that contracts have not yet been let for work to be carried out on a change of line between Yoakum, Ore., and Pendleton, 13 miles. The work will be heavy, with several channel changes of the Umatilla river. Maximum grades will be 31.7 ft. per mile and maximum curvature 4⅓ deg. There will be three steel bridges, each with two 150-ft. spans, and one tunnel 500 ft. long. (Jan. 28, p. 209.)

OREGON SHORT LINE.—See Central Idaho.

PENNSYLVANIA ROADS (ELECTRIC).—Charters have been granted in Pennsylvania to six companies, each with a capital of $5,000, and offices at York, Pa. The incorporators of all the companies are: G. A. Greenawalt, J. J. Gerry and H. B. Waltman, York. The companies are to operate electric lines in Hellam, Manchester, Dover, Mount Wolf, North York and West York, all in York county, Pa., and each company will take the name of the town in which its line is to be located.

SAN ANTONIO, RIO GRANDE & TAMPICO.—An officer writes that contracts are to be let about March 1 and work will then be started on this line. The plans call for a line from San Antonio, Tex., southwesterly to a point in La Salle county, about 90 miles. There will be three bridges. The Harrison Engineering Co., 42 East Twenty-third street, New York, are the general engineers and contractors. J. F. Edwards, president; W. A. Cullen, general manager, and G. W. Nock, chief engineer, San Antonio. (See San Antonio, Gulf & Tampico. Feb. 11, p. 329.)

TEMISKAMING & NORTHERN ONTARIO.—The government will be petitioned to build an extension from North Bay, Ont., southwest to Parry Sound, about 75 miles. The cost of the line is estimated at $50,000 a mile. (Nov. 26, p. 1038.)

Bids are wanted for grading one mile of line in Ontario between mile post 60 and mile post 61.

TEXAS & PACIFIC.—According to press reports a proposition has been made to residents of Monahans, Tex., Grandfalls and Fort Stockton, to build a branch from the Texas & Pacific at Monahans south via Grandfalls to Fort Stockton on the Kansas City, Mexico & Orient, 58 miles.

TEXAS ROADS.—According to press reports G. B. Miller, Falfurrias, Tex., is back of a project to build a line from a point west of Realitos, on the National Lines of Mexico, southeast to Falfurrias, thence northeast via Kingsville to Corpus Christi, 96 miles. The estimated cost of the line is $1,000,000. (Jan. 28, p. 210.)

WASHINGTON & TIDEWATER.—A promoter writes that a charter has not yet been granted. The plans call for a line from a point in the District of Columbia, southeast to tidewater, in St. Marys county, Md., about 60 miles. W. Bannard Duke, Baltimore, may be addressed.

Railway Financial News.

Albany & Northern.—See Georgia, Southwestern & Gulf.

Boston & Maine.—This company has asked the authority of the Massachusetts Railroad Commission to buy a majority of the capital stock of the Worcester, Nashua & Rochester, a leased line.

See Boston Railroad Holding Co.

Boston Railroad Holding Co.—This company has asked the Massachusetts Railroad Commission for authority to issue $680,400 additional stock and to buy $2,786,800 additional common stock of the Boston & Maine and $71,700 preferred stock of the B. & M. The Holding company is to pay $125 in 4 per cent. bonds and $30 in stock for each share of B. & M. common, and $125 in bonds and $37 in stock for each share of preferred. With the present issue of stock there will be outstanding $3,102,000 Railroad Holding company stock.

Canadian Pacific.—This company has leased the property of the Orford Mountain Railway, and after March 1, 1910, the Orford Mountain will be operated as the Orford Branch, District 1, Eastern division of the Canadian Pacific. The Orford Mountain runs from Winsor Mills, Que., to Eastman Junction, 28 miles.

Chesapeake & Ohio.—An officer is quoted as saying that there are negotiations now pending by which the Chesapeake & Ohio will acquire control of the Hocking Valley. This statement is said by the company to be "premature and unauthorized." The C. & O., the Erie, the Baltimore & Ohio and the Lake Shore & Michigan Southern own each a sixth share of the stock of the Hocking Valley, and the Pittsburgh, Cincinnati, Chicago & St. Louis owns the remaining two-sixths shares.

Chicago & North Western.—This company will pay off in cash its $1,500 000 underlying Northern Illinois Railway 5 per cent. first mortgage bonds. The company takes this method of retiring this issue rather than refunding same by issuing new general mortgage bonds, a sufficient amount of which are reserved for the purpose. Although the outstanding general bonds bear 3½ per cent. interest, any new bonds under the same mortgage may bear not to exceed 5 per cent. The 3½s are now selling at 88¾ and were marketed at about 10 points above that figure.

Dallas, Cleburne & Southwestern.—The Missouri, Kansas & Texas has bought all the securities of this company, whose road runs from Egan, Tex., to Cleburne, 10 miles. There are $10,000 stock and $150,000 bonds outstanding. The road has previously been operated by the Missouri, Kansas & Texas under contract, terminable at 30 days' notice.

Denver, Laramie & Northwestern Railway.—Stockholders have voted to transfer the property of this company to the Denver, Laramie & Northwestern Railroad, which has been incorporated in Wyoming and has authority to extend the line to Seattle, Wash.

Georgia, Southwestern & Gulf.—This company has gained control of the Albany & Northern, whose road runs from Albany, Tex., to Cordele, 37 miles.

Grand Trunk.—The directors have declared in addition to the full 4 per cent. dividend on the guaranteed stock and the full dividends on the first preference stock, a dividend of 5 per cent. for the calendar year 1909 on the second preference stock. This compared with 2½ per cent. paid from the earnings of 1908.

Gulf Line Railway.—Control of this company, which leases the Hawkinsville & Florida Southern, has been sold to eastern capitalists, who, it is said, will extend the line from Bridgeboro, Ga., to Camilla, 40 miles. The Gulf Line and the H. & F. S. run from Hawkinsville, Ga., to Bridgeboro, 79 miles.

Hawkinsville & Florida Southern.—See Gulf Line Railway.

Joplin Union Station.—This company has sold to George C. White, Jr., & Co., New York, and the Philadelphia Trust, Safe Deposit & Insurance Co., Philadelphia, $750,000 first mortgage 4½ per cent. bonds of 1910-1940. The station when completed will be used by the Atchison, Topeka & Santa Fe, the Kansas City Southern, the Missouri, Kansas & Texas and the Missouri & North Arkansas, which jointly own the entire $40,000 outstanding stock.

Kansas City Terminal.—This company has sold $10,000,000 of its authorized $50,000,000 4 per cent. 50-year bonds to a syndicate headed by Lee, Higginson & Co., Boston; J. P. Morgan & Co., New York, and the Illinois Trust & Savings Bank, Chicago.

Missouri, Kansas & Texas.—See Dallas, Cleburne & Southwestern.

New York, New Haven & Hartford.—George F. Baker has been elected a director, succeeding H. McK. Twombly, deceased.

Northern Central.—The annual report of this subsidiary of the Pennsylvania Railroad shows that the company earned $12,264,770 gross in the calendar year 1909, as compared with $11,264,986 in 1908. Total operating expenses were $9,581,499 last year and $8,715,291 the year before. This left net earnings from operation after payment of taxes of $2,326,433 in 1909, as compared with $2,228,920 in 1908. After the payment of fixed charges and the regular 8 per cent. dividends, there was left a balance of $996,215 in 1909, from which $800,000 was deducted and transferred to extaordinary expenditure account, leaving a surplus to the credit of profit and loss of $196,215.

The freight-ton mileage in 1909 totaled 1,543,516,513 miles. This is an increase of nearly 11 per cent. over the freight-ton mileage in 1908. At the same time freight-train mileage increased less than 5 per cent. and totaled 2,997,872 in 1909. Earnings per ton per mile averaged 0.616 cents in 1909, a decrease of 0.006 cents from 1908. The freight density was 3,302,346 in 1909, an increase of just about 10 per cent. over 1908. The average trainload last year was 514.87 tons, an increase of 28.49 tons over the year before. The passenger mileage totaled 105,705,834 in 1909, an increase of 7 per cent. over 1908, and passenger-train mileage at the same time decreased a little over 2 per cent., totaling 2,169,494 in 1909. Earnings per passenger per mile averaged 1.985 cents in 1909, an increase of 0.023 cents over 1908, or slightly over 1 per cent.

Maintenance of way cost $1,496,153 in 1909, an increase of $551,469, and maintenance of equipment cost $2,354,673. an increase over 1908 of $126,330. Transportation cost $5,323,939, an increase of $171,939.

Current assets amounted to $4,944,452 December 31, 1909, of which $2,730,224 was cash and $1,247,056 was due from individuals and companies. This is an increase over the amount of cash on hand December 31, 1908, of $399,287, and an increase in sums due from individuals and companies of $930,685. Current liabilities amounted to $2,777,398 last year, the principal increase over the year being in vouchers and pay roll checks, which amounted in 1909 to $1,239,861, or $487,367 more than in 1908.

Orford Mountain Railway.—See Canadian Pacific.

Pittsburgh, Shawmut & Northern.—Edwin Hawley has been elected a director of this company. It is said that Mr. Hawley became a member of the board at request of Gen. Thomas H. Hubbard, and that his election does not indicate any pending changes in control.

Reading Company.—George F. Baker has been elected a director of this company, the Philadelphia & Reading Railway and the Philadelphia & Reading Coal & Iron Co., succeeding H. McK. Twombly, deceased.

Texas & Pacific.—No interest payments have been made on the second income mortgage bonds since 1908, when 3½ per cent. was paid. The preliminary statement of earnings, it is said, show a balance sufficient to pay interest on the second income bonds, but the directors prefer to devote this surplus to paying off a part of the floating debt, which amounted December 31, 1908, to $5,865,397.

Wabash-Pittsburgh Terminal.—The receivers have asked the United States circuit court for authority to issue receivers' certificates to buy 500 steel hopper cars at a cost of $512,500.

Supply Trade Section.

Fire damaged the plant of the Mt. Vernon Bridge Co., Mt. Vernon, Ill., on February 14. The loss is estimated at $125,000.

Burton W. Mudge & Co., Commercial National Bank building, Chicago, announces the appointment of Otto P. Hennig as sales manager, in charge of sales, advertising and purchasing.

The Gold Car Heating & Lighting Co., New York, has received orders for the heating equipment for the 30 passenger coaches now building at the Pullman works for the Pere Marquette.

W. D. Beck, formerly division superintendent on the Chicago & North Western at Chicago, has resigned to become general manager of the Aurora Automatic Machinery Company, Aurora, Ill.

The Bettendorf Axle Co., Davenport, Iowa, has let the contract for a brick and concrete foundry. The plans for this addition to the plant were mentioned in the *Railway Age Gazette* of August 20, 1909.

Hotchkiss, Blue & Co., Railway Exchange, Chicago, has incorporated in Illinois with a capital of $60,000. The officers of the new company are the same as the members of the old partnership, having the same name.

J. H. Horn, formerly with the American Locomotive Co., New York, has entered the employ of the National Lock Washer Co., Newark, N. J. He will handle both curtain fixtures and lock washers in a sales capacity.

John B. Given, formerly assistant to the vice-president of the Duplex Metals Company, New York, has resigned and is now connected with C. H. Whall & Co., makers of fiber insulators and fuses, with office at Boston, Mass.

Henry Pearson, president of the Wason Manufacturing Co., Springfield, Mass., will resign to become general consulting engineer for the J. G. Brill Co., Philadelphia, Pa. Mr. Pearson remains a director of the Wason Manufacturing Co. Samuel M. Curwen, a vice-president of the J. G. Brill Co., will become president of the Wason Manufacturing Co.

L. G. Parker has entered the sales department of the Cleveland Frog & Crossing Co., Cleveland, Ohio. Mr. Parker was, for a number of years, connected with the engineering department of the Lake Shore & Michigan Southern at Cleveland and at Toledo, after which he was similarly engaged with the Chicago Terminal Transfer Railroad at Chicago.

The Williamsport Gas Engine Works, Williamsport, Pa., has reopened the plant of the Williamsport Gas Engine Co., which has been shut down during the past year. The new company will continue to manufacture the complete line of gas and gasolene engines as did the old company. The management is looking for active agents in all sections of the country.

The Gulick-Henderson Co., inspecting engineers, metallurgists and chemists, Pittsburgh, Pa., Chicago and New York, announces that J. W. Henderson, treasurer, has resigned to become manager of the Verona works of the Standard Steel Car Co., New York. The metallurgical and foundry department of the Gulick-Henderson Co., which has been under Mr. Henderson's supervision, will in the future be managed by W. G. Ireland.

Due to the increase in business, both the Chicago and the Baltimore, Md., branches of the H. W. Johns-Manville Company, New York, will on March 1 be moved into larger quarters. The Chicago branch will occupy the four-story and basement building at 27-29 Michigan avenue. The offices, store and stock rooms will occupy 32,500 sq. ft. of floor space. The Baltimore office, store and ware house will be moved to 30 Light street. A complete line of the J-M products will be carried, and the company will be in much better position than ever before to give orders prompt attention.

The Virginia Bridge & Iron Company, Roanoke, Va., is at the present time building 2,000 all-steel hopper cars for one company and 500 steel underframes for another. During the past year this company has built about 8,000 gondola cars and underframes, and it is at the present time making preparations to handle a much larger volume of business. This car work is handled in addition to the company's regular output of bridges and structural steel, and it has recently installed a large amount of new equipment, which gives the Roanoke plant a capacity of about 60,000 tons per year, including car work.

The report of the Union Switch & Signal Co. for the year ended December 31 shows net profits on the combined $497,600 preferred and $2,000,000 common stock amounted to 13.05 per cent., as compared with 3.12 per cent. in 1908, and 41.03 per cent. in 1907. Gross sales increase $507,938, or 24.1 per cent., and net profits $248,135, equivalent to 317.9 per cent. over 1908. The following table shows current assets and liabilities.

	1909.	1908.
Current Assets.		
Material in stock	$1,416,505	$986,473
Bills and accounts receivable	1,057,134	702,364
Cash	61,126	695,456
Total	$2,534,765	$2,384,293
Current Liabilities.		
Bills and accounts payable	$394,554	$135,978
Unclaimed dividends	2,544	2,145
Total	$397,098	$138,123
Working capital	$2,137,667	$2,246,170

1910 M. M. and M. C. B. Conventions.

The drawing for exhibit space on Young's Million Dollar Pier for the June conventions was held at the office of the secretary, in Pittsburgh, last week, under the direction of the Exhibit Committee, Messrs. B. E. D. Stafford, S. P. Bush and Chas. P. Storrs. Fully 95 per cent. of the entire space available, as shown on the diagrams of the association, was assigned to applicants. This is record work, as in previous years the allotments at the time of drawing have been nothing like that amount. As experience has shown that a considerable number of applications for exhibit space are made within a few weeks of the date of the opening of the convention, and as the capacity of the pier is limited, the probability is that the pier itself will have to be widened if the late comers are to be accommodated.

Railway Appliances Exhibit.

The exhibition of the latest improvements in devices used in the construction and maintenance of American railways, which will be held at the Coliseum in Chicago March 14-19, the week that the American Railway Engineering and Maintenance of Way Association will hold its annual convention, will be more complete than the one which was held last year and which was declared to be of a more highly educational nature than any exhibition of like nature ever held before.

The main floor of the Coliseum contains 45,317 sq. ft. of space. Allowing 12,800 sq. ft. for aisles, leaves 32,517 sq. ft. for exhibits. In addition to this there are 6,138 sq. ft. available in the annex. All of the main floor has been taken by exhibitors, and all but about 400 sq. ft. in the annex. This will be sold before the exhibit opens. Last year the attendance of railway officers was much greater than was expected, and a large number who did not realize the importance of the exhibition and did not attend have expressed an intention not only to be in attendance this year but to instruct their subordinates to attend, believing the knowledge they obtain will be of great value to the different departments of the railways. Following is a list of exhibitors listed to date, along with their respective space numbers:

Adams & Westlake, Co., Chicago....83-84
Alexander Continuous Crossing Co., Clinton....204-5-8-9
Allith Mfg. Co., Chicago....116
American Concrete Co., Chicago....15
American Guard Rail Fastener Co., Philadelphia, Pa....118
American Hoist & Derrick Co., St. Paul, Minn....189-90-91
American Loco. Co. and Atlantic Equip. Co., Chicago....30
American Railway Device Co., Chicago....177

American Railway Signal Co., Cleveland, Ohio....22-23
American Rolling Mill Co., Middletown, Ohio....75-76
American Steel & Wire Co., Chicago....69-70, 50-51
American Valve & Meter Co., Cincinnati, Ohio....130-131
American Well Works, Aurora, Ill....12-13
Cortlandt F. Ames, Chicago....115
Armspear Mfg. Co., New York....184
Asphalt Ready Roofing Co., New York....168
Atlas Portland Cement Co., New York....146
Alamo Mfg. Co., Hillsdale, Mich....81
Adreon Mfg. Co., St. Louis, Mo....109
American Railway Steel Tie Co., Harrisburg, Pa....217-218
American Rail Joint Co., Toronto, Can....194
Barrett Mfg. Co., New York....106
Beaver Dam Malleable Iron Co., Beaver Dam, Wis....166
J. A. & W. Bird & Co., Boston, Mass....140
Blocki-Brennan Refining Co., Chicago....169
W. E. Bossert Mfg. Co., Utica, N. Y....137
Bryant Zinc Co., Chicago....153-4-5-6
Buda Co., Chicago....87-88-89-90
Buff & Buff Mfg. Co., Chicago....94
Bausch & Lomb Optical Co., Rochester, N. Y....135
Badger Brass Mfg. Co., Beaver Dam, Wis....½ of 220
Card & McArdle, Waukegan, Wis....21
Philip Carey Co., Cincinnati, Ohio....170
Carnegie Steel Co., Pittsburg, Pa....71-72, 52-53
H. Channon Company, Chicago....160
Chicago Steel Tape Co., Chicago....94
Cleveland Frog & Crossing Co., Cleveland, Ohio....102-3-4
Jas. B. Clow & Sons, Chicago....33
Central Electric Co., Chicago....203, 210
Conley Frog & Switch Co., Memphis, Tenn....34
Coulter Paxton Co., Hammond, Ind....172
Crerar Adams Co., Chicago....95-96
Detroit Graphite Co., Detroit, Mich....167
Detroit Hoist & Machine Co., Detroit, Mich....193
Paul Dickinson, Inc., Chicago....186
Eugene Dietzgen Co., Chicago....97
Dilworth, Porter & Co., Pittsburgh, Pa....26
Jos. Dixon Crucible Co., Jersey City, N. J....117
Dressel Railway Lamp Works, New York....5
Duntley Mfg. Co., Chicago....99-100
Duplex Metals Co., New York....38-39
G. Drouvé Co., Bridgeport, Conn....158
Eastern Granite Roofing Co., Chicago....129
Economy Separable Switch Point Co., Louisville, Ky....187
Edison Mfg. Co., Orange, N. J....151
O. M. Edwards Co., Syracuse, N. Y....150
Electric Storage Battery Co., Philadelphia, Pa....149
Fairbanks, Morse & Co., Chicago....35-36-37, 54-5-6
Federal Signal Co., Troy, N. Y....93
Ford & Johnson, Chicago....159
Frank M. Foster, Columbus, Ohio....138
Forsyth Steel Tie Co., Pittsburg, Pa....1-2, 16-17
Franklin Mfg. Co., Franklin, Pa....6
General Railway Signal Co., Rochester, N. Y....57-8-9-60
Goheen Mfg. Co., Canton, Ohio....109
Peter Gray & Sons, Boston, Mass....175
Greenlee Bros., Chicago....7-8
Grip Nut Co., Chicago....40-41
Hall Signal Co., New York, N. Y....80
Handlan-Buck Mfg. Co., St. Louis, Mo....125
Hart Steel Co., Elyria, Ohio....101
Hayes Track Appliance Co., Geneva, N. Y....139
Heath & Milligan, Chicago....179
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TRADE PUBLICATIONS.

Great Northern.—The Great Northern has distributed three mailing cards advertising the company's three daily trains to the Pacific coast, the special colonist, settlers and homeseekers rates to the northwest, and the trans-Pacific service of the Ss. Minnesota.

RAILWAY STRUCTURES.

COLUMBUS, GA.—The Central of Georgia is to build a bridge over the Chattahoochie river. The superstructure will consist of plate girders which have been ordered from the American Bridge Co. The piers will be of concrete and the bids for this work have been received.

GREENSBURG, IND.—The Cleveland, Cincinnati, Chicago & St. Louis has built an impounding reservoir with a capacity of 25,000,000 gals.

INDIANAPOLIS, IND.—The Indianapolis Union Ry. has ordered improvements made on the union station to cost about $75,000. No change in the size of the building is to be made, but the interior arrangement is to be improved so as to greatly increase the capacity.

OUTLOOK, SASK.—See Canadian Pacific under Railway Construction.

STOCKTON, CAL.—The Atchison, Topeka & Santa Fe contemplates the building of a new freight depot at a cost of about $20,000, on land now owned by the company. (Dec. 24, p. 1264.)

STRATHCONA, ALB.—See Canadian Pacific under Railway Construction.

TEMPLE, TEX.—The Gulf, Colorado & Santa Fe is to build a Harvey hotel and eating house at a cost of $140,000.

VALDOSTA, GA.—The Georgia, Southern & Florida is said to have bought 14 acres of land in the southern part of Valdosta as a site for extensive repair shops. Work is to be started soon filling in the lowland to raise the grade several feet. The improvements include a 20-stall roundhouse. Work is now under way raising the grade about eight feet on five acres of land west of the passenger station; the site will be used to increase the capacity of the yards.

WACO, TEX.—The Citizens' Railway plans to build a car shop and barns at an estimated cost of $75,000.

WEST DULUTH, MINN.—See Duluth, Rainy Lake & Winnipeg under Railway Construction.

At the ten freight stations in Berlin 60,636,000 gallons of milk were received last year, which is 5 per cent. more than in 1908. More than half of the increase in receipts came from Denmark. In the same year the Berlin receipts of coal and coke were 2,609,541 short tons, slightly more than half coming by water. Of the coal 1,040,712 tons was English, which has water transportation up the Elbe and the small but very useful Havel, on which Berlin is situated. A slightly larger tonnage came from Silesia, far to the southeast. Besides this Berlin received 1,495,093 short tons of liquite ("brown coal"), nearly all by rail. It is an inferior fuel, weighing about three-fourths as much as stone coal per cubic yard.

Late News.

The items in this column were received after the classified departments were closed.

George F. Baker has been elected a director of the Delaware, Lackawanna & Western succeeding H. McK. Twombly, deceased.

The Castalia Portland Cement Co., Pittsburgh, Pa., has ordered one 10-in. x 16-in. saddle tank locomotive from the Vulcan Iron Works.

An increase of 10 per cent. in salaries has been granted by the Western Maryland to its telegraphers. More than 300 operators will be affected by the advance.

According to press reports, the branch of the St. Louis, Brownsville & Mexico, from Bloomington, in Victoria county, Tex., southeast to Port O'Connor, 39.72 miles, is to be opened for business March 1. (Oct. 22, p. 778.)

Engineers, firemen and telegraphers on the Delaware & Hudson have presented demands for increased pay. The demands range from 5 per cent. to 70 per cent., but the average calls for a general increase approximating 20 per cent.

An officer of the Wichita Falls & Northwestern writes that this company has bought from the Altus, Roswell & El Paso part of their grade from Altus, Okla., west to Hollis. The new owners expect to build about 60 miles at once to complete this line to Hollis. (Dec. 24, p. 1261.)

The Philadelphia & Reading announce that on account of falling off in volume of traffic and consequent loss of revenue the company has issued orders reducing the hours of labor in all locomotive and car shops to eight hours a day, beginning on February 28. This will effect a reduction in shop expenses of about 15 per cent.

The Cleveland, Cincinnati, Chicago & St. Louis will lay second track this year from Indianapolis, Ind., to Anderson, on the Indianapolis division. Also, second track from Shelby, Ohio, to Greenwich, on the Cleveland division, as well as build a 7½-mile cut-off from Middletown, Ohio, to Miamisburg, on the Cincinnati division. The new line from Mt. Carmel, Ill., to Evansville will also be built this year.

E. M. Alvord, general superintendent of the Missouri, Kansas & Texas, at St. Louis, Mo., has been appointed general manager of the Midland Valley, with office at Muskogee, Okla. J. W. Walton, acting general superintendent of the Missouri, Kansas & Texas of Texas, at Dallas, Tex., has been appointed general superintendent of the Missouri, Kansas & Texas system, with office at St. Louis.

Samuel Moody, general passenger agent of the Pennsylvania Lines West, at Pittsburgh, Pa., has been appointed to the new position of assistant passenger traffic manager of the Pennsylvania Lines West and of the Vandalia, with office at Pittsburgh. J. M. Chesbrough, general passenger agent of the Vandalia at St. Louis, Mo., succeeds Mr. Moody, and J. B. Modisette, assistant general passenger agent of the Pennsylvania Lines West, at Pittsburgh, succeeds Mr. Chesbrough.

A McKeen motor car, No. 90, built for the Norfolk & Southern, will leave the shops of the McKeen Motor Car Co., Omaha, Neb., on February 25 under its own power for Richmond, Va. It will go over the following route: Omaho to Chicago, via Chicago, Burlington & Quincy; Chicago to Indianapolis, via Chicago, Indianapolis & Louisville; Indianapolis to Cincinnati, via Cincinnati, Hamilton & Dayton; Cincinnati to Washington, via Baltimore & Ohio, and from Washington to Richmond, via Richmond, Fredericksburg & Potomac.

At a meeting of directors of the Chicago Pneumatic Tool Co., Chicago, on February 23, a resolution was passed that it was the opinion of the directors that on March 22, a quarterly dividend of 1 per cent. should be declared, payable April 25 to stock of record April 15. At the last previous meeting it was voted to declare a dividend at the next regular meeting. The meeting on Wednesday, however, was merely an organization meeting at which officers were re-elected. In 1907 dividends which had been at the rate of 4 per cent. per annum were passed.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Texas Central has ordered four 2-8-0 locomotives from the American Locomotive Co.

Roman & Bennett, Toston, Mont., have ordered six contractors' locomotives from the Vulcan Iron Works.

The Toledo, Peoria & Western has ordered two consolidation locomotives from the Baldwin Locomotive Works.

The Richmond, Fredericksburg & Potomac is said to be asking prices on 20 locomotives. This item is not confirmed.

The San Antonio, Gulf & Tampico, San Antonio, Texas, recently incorporated, advises that it will buy locomotives about May next.

The Colorado & Southern is in the market for 15 locomotives and will also order seven locomotives for the Fort Worth & Denver City.

Quinlan & Robertson, railway contractors, Montreal, Que., have ordered four 12-in. x 16-in. contractors' locomotives from the Vulcan Iron Works.

Scott Bros., Railway Contractors, Baldwinsville, N. Y., have ordered two 14-in. x 20-in. double-end saddle tank locomotives from the Vulcan Iron Works.

The Enterprise Mfg. Co. of Pennsylvania, Philadelphia, Pa., has ordered one 16-in. x 24-in. saddle tank switching locomotive from the Vulcan Iron Works.

The Ferguson Contracting Co., New York, has ordered one 14-in. x 20-in. double-end saddle tank locomotive of standard gage from the Vulcan Iron Works.

The Hocking Valley, reported in the *Railway Age Gazette* of January 21 as being in the market for 23 locomotives, has ordered 10 consolidation locomotives from the American Locomotive Co.

The New York, Ontario & Western, as reported in the *Railway Age Gazette* of February 11, has ordered six simple consolidation locomotives from the American Locomotive Co.

General Dimensions.

Weight on drivers	182,000 lbs.
Total weight	205,000 lbs.
Cylinders	21 in. x 32 in.
Diameter of drivers	55 in.
Type of boiler	Straight top, radial stay
Working steam pressure	200 lbs.
Heating surface, fire tubes	3,013 sq. ft.
" " arch tubes	22 "
" " firebox	183 "
" " total	3,218 "
Tubes, number	398
" outside diameter	2 in.
" length	14 ft. 6½ in.
Firebox, length	107⅛ "
" width	67¼ "
" material	Carbon steel
Grate area	49.8 sq. ft.
Water capacity	7,000 gals.
Coal capacity	11 tons

Special Equipment.

Axles	Nickel steel
Bell ringer	Sanson
Boiler lagging	Ehrets sectional magnesia
Brakes	American
Brake-beams	Kewanee
Brake-shoes	Perfecto; Am. Brake-Shoe Co.
Couplers	Gould pilot
Driving boxes	Cast steel, sectional bronze bearings
Headlight	18-in. Dressel
Injector	No. 10 Simplex
Journal bearings	Cyprus bronze
Piston and valve rod packings	King
Safety valve	Consolidated, 3-in.
Sanding devices	Hanlon
Sight-feed lubricators	Nathan, No. 9
Springs	Railway Steel-Spring Co.
Staying	"Tate" and "Breakless" bolts
Steam gages	Ashcroft, 6¾-in.
Tender frame	Comonwealth cast steel
Tires	Midvale, flanged
Tubes	Spellerized
Valve gear	Baker-Pilliod
Wheel centers	Cast steel

The Delaware, Lackawanna & Western locomotives previously reported as ordered from the American Locomotive Co. include the following: Twenty-four consolidation, five 10-wheel passenger, five eight-wheel passenger, nine six-wheel switch, two eight-wheel hump yard and one eight-wheel transfer engine. The consolidation, 10-wheel passenger and eight-wheel

transfer locomotives will be equipped with Walschaerts valve gears, while the others will have Stephenson link motion.

General Dimensions.

Type	Consolidation.	10-wheel.
Weight on drivers	169,500 lbs.	168,000 lbs.
Total weight	190,000 lbs.	214,000 lbs.
Cylinders	21 in. x 26 in.	22½ x 26 in.
Diameter of drivers	57 in.	69 in.
Type of boiler	Straight top.	Straight top.
Working steam pressure	200 lbs.	215 lbs.
Heating surface, tubes	2,573 sq. ft.	3,178 sq. ft.
" " firebox	173 "	247 "
" " total	2,747 "	3,425 "
Tubes, number	337	398
" outside diameter	2 in.	2 in.
" length	14 ft. 5⅞ in.	15 ft. 3 in.
Firebox, type	Semi-wide.	Wide.
" length	8 ft. 6 in.	11 ft. 6 in.
" width	6 ft. 3 in.	9 ft.
" material	O. H. basic.	O. H. basic.
Grate area	53.4 sq. ft.	103.5 sq. ft.
Water capacity	6,500 gals.	7,000 gals.
Coal capacity	10 tons.	10 tons.
Tractive power	34,197 lbs.	34,861 lbs.

Type	8-wheel	6-wheel.
Weight on drivers	100,000 lbs.	133,000 lbs.
Total weight	150,000 lbs.	133,000 lbs.
Cylinders	20 in. x 26 in.	19 in. x 24 in.
Diameter of drivers	69 in.	51 in.
Type of boiler	Straight top.	Straight top.
Working steam pressure	185 lbs.	180 lbs.
Heating surface, tubes	1,961 sq. ft.	1,690 sq. ft.
" " firebox	179 "	164 "
" " total	2,140 "	1,854 "
Tubes, number	280	269
" outside diameter	2 in.	2 in.
" length	13 ft. 4½ in.	12 ft.
Firebox, type	Wide.	Semi-wide
" length	10 ft. 6 in.	7 ft. 6 in.
" width	8 ft. 4 in.	6 ft. 3 in.
" material	O. H. basic.	O. H. basic.
Grate area	87.6 sq. ft.	46.3 sq. ft.
Water capacity	5,000 gals.	3,300 gals.
Coal capacity	10 tons.	7 tons.
Tractive power	23,701 lbs.	26,000 lbs.

The following special equipment is common to all types:

Special Equipment.

Axles	Driving wheels, Cambria steel, main 9½ x 12, other 9 x 12; Tender axle, Cambria steel, 5 x 9
Bell ringer	Gollmar
Boiler lagging	Sectional magnesia
Brakes	Westinghouse-American
Brake-beams	Westinghouse
Brake-shoes	Perfecto type on drivers
Couplers	Cast steel, Gould Coupler Co.
Draft gear	Session friction, type C, on tender, with Acme uncoupling device
Driving boxes	Cast stl, with Elvin, type 4, grease cellars
Headlight	Dressel
Injector	Hancock composite inspirator
Journal bearings	Magnus bearings
Journal boxes	Symington 5x9 M.C.B. on tender, with torsion lids
Piston and valve rod packings	United States
Safety valve	Two 3-in. consolidated, one muffled, one encased
Sanding devices	Leach air and hand sander
Sight-feed lubricators	Nathan
Springs	O. H. steel, D., L. & W. specification
Staying	Tate flexible bolts in breaking zone
Steam gages	Ashcroft
Tires	3½ in. thick Midvale flanged; all 5½ in. wide.
Tubes	Spellerized steel
Wheel centers	50-in. cast steel

CAR BUILDING.

The Hilo Railway, Honolulu, H. I., is in the market for 10 forty-ton box cars.

The Mexican Railway has ordered 14 sleeping cars from the Barney & Smith Car Co.

The Chicago Great Western is in the market for 200 steel underframe forty-ton box cars.

The Mexico North Western is said to be in the market for 260 freight cars. This item is not confirmed.

The San Antonio, Gulf & Tampico, San Antonio, Texas, recently incorporated, advises that it will buy cars about May next.

The Cleveland Municipal Traction Co., Cleveland, Ohio, for which franchise negotiations are now pending, will buy a number of city cars in case the negotiations are successful.

The Delaware, Lackawanna & Western, reported in the *Railway Age Gazette* of December 17 as being in the market for 10 express, 15 suburban and 10 broad vestibule coaches, has ordered 10 broad vestibule coaches and 10 suburban coaches from the Barney & Smith Car Co.

The Hill Lines have ordered 4,000 freight cars from Haskell & Barker. The equipment includes 3,500 box and 500 automobile cars. It is understood that the Chicago, Burlington & Quincy will get 1,500 of the box cars and that it will soon be in the market for passenger equipment.

The National Railways of Mexico, reported in the *Railway Age Gazette* of October 15 as being in the market for 10 first-class coaches; five second-class coaches; eight baggage, mail and express cars and three express cars, has ordered this equipment from the American Car & Foundry Co.

The Chicago, Rock Island & Pacific, reported in the *Railway Age Gazette* of February 11 as being in the market for 825 forty-ton steel underframe box cars, has ordered this equipment from the Western Steel Car & Manufacturing Co. The original inquiry included 1,600 cars, so that there are still 775 cars unplaced.

The Buffalo, Rochester & Pittsburgh has ordered from the McKeen Motor Car Co. one 70-ft. gas motor car of all-steel, center entrance type, having baggage, smoking and passenger compartments. The company has also ordered from the General Electric Co. one 70-ft., all-steel, center entrance gas electric car, with the same arrangement of compartments as the McKeen car.

The New York, Ontario & Western, as reported in the *Railway Age Gazette* of February 4, has ordered 300 forty-ton double hopper gondola cars from the American Car & Foundry Co. These cars will weigh 37,200 lbs. and will be 33 ft. long, 8 ft. 11½ in. wide and 5 ft. ⅜ in. high, inside measurements, and 34 ft. 6½ in. long, 9 ft. 8½ in. wide and 9 ft. 4½ in. high, over all. The bodies will be of wood and the underframes of steel. The special equipment will include:

Bearings	Barber roller device
Bolsters, truck	Cast steel
Brakes	Westinghouse
Brake-beams	Buffalo special section
Brake-shoes	Steel back, gray iron
Brasses	Brady Brass Co.
Couplers	Sharon
Coupler carry iron	Flory
Doors, drop	Dunham
Draft gear	Miner and Farlow
Dust guards	Symington
Journal boxes	Symington
Springs	Railway Steel-Spring Co.
Trucks	Gould Coupler Co.
Wheels	American Car & Foundry Co.

The New York, Chicago & St. Louis, as reported in the *Railway Age Gazette* of January 28, has ordered 10 passenger and five baggage cars from the American Car & Foundry Co. The passenger cars will weigh 92,400 lbs. and will have the following dimensions: Inside, length, 60 ft.; width, 9 ft. 8 in.; height, 7 ft. 8 in. Over-all, length, 69 ft. 5 in.; width, 10 ft. ½ in.; height, 14 ft. 6¾ in. The baggage cars will have a capacity of 30,000 lbs., will weigh 78,750 lbs., and will have the following dimensions: Inside, length, 60 ft.; width, 8 ft. 11 in.; height, 7 ft. 8 in. Over-all, length, 64 ft. ½ in.; width, 10 ft. ½ in.; height, 14 ft. 7 in. All the cars will have wood underframes and bodies and will have the following special equipment:

Axles	Steel
Bolsters	Built up
Brakes	Westinghouse
Brake-beams	Waycott
Brake-shoes	American Brake-Shoes Co.
Brasses	Magnus
Couplers	Tower
*Curtain fixtures	Curtain Supply Co.
*Curtain material	Pantasote.
*Door fastenings	Blount
Draft gear	Gould friction
Heating system	Chicago Car Heating
Journal boxes	Franklin
Lighting system	Pintsch
*Platforms	Gould
*Seat covering	Plush
Side bearings	Woods roller
Springs	Railway Steel Spring
Trucks	Company standard metal
*Vestibules	Pullman
*Vestibules diaphragms	Ajax
*Vestibule trap doors	Edwards
Wheels	Paige steel tired

*Equipment specified on passenger cars only.

The Detroit United Railways advise that orders have recently been placed for the equipment for which they were reported in the market in the *Railway Age Gazette* of February 11. The order was divided as follows: Fifty double truck pay-as-you-enter cars from the G. C. Kuhlman Car Co. and

25 similar cars from the Niles Car & Mfg. Co., the trucks for the 75 cars to be furnished by the Standard Motor Truck Co. and the motor equipments by the Westinghouse Electric & Mfg. Co. In addition to these cars, an order was placed with the Niles Car & Mfg. Co. for 14 interurban cars to be equipped with Baldwin trucks and Westinghouse motors.

MACHINERY AND TOOLS.

The Bethlehem Steel Co. has ordered the machinery for which it was reported in the market in the *Railway Age Gazette* of February 11. It is understood the order was divided among three companies.

The Cedar Rapids & Marion City Railway Co. has ordered from the Allis-Chalmers Co. a complete generating unit, consisting of a 22-in. and 46-in. x 48-in., heavy duty, cross-compound engine, direct-connected to an 800-k.w., 600-volt, 100-r.p.m. generator.

The New York Central Lines have ordered from Joseph T. Ryerson & Sons, Chicago, a 60-in. punch designed to punch 2-in. holes in 1-in. material, and a special friction metal saw designed for railway shop work by the Ryerson Co. The tools are to be installed in the shops at Depew, N. Y.

IRON AND STEEL.

The Northern Pacific has ordered 440 tons of bridge steel for a lift bridge.

The Pennsylvania Lines West have received bids on 900 tons of steel for signal bridges.

The Metropolitan Street Railway, New York, has received bids on 3,550 tons of girder rails and 880 tons of conductor bars.

The Alabama, Birmingham & Atlantic has ordered from the Lackawanna Bridge Co. 150 tons of bridge steel for three small bridges.

The Great Northern has ordered from the American Bridge Co. 9,000 tons of structural steel for the ore docks at Allouez Bay, Wis. The company's steel requirements for this work were mentioned in the *Railway Age Gazette* of February 4.

General Conditions in Steel.—The annual report of the Lackawanna Steel Co. for 1909 shows an increase in gross earnings over 1908 of $10,208,000. Although manufacturing expenses rose $7,845,000, a surplus of $778,000 was saved after paying royalties, rentals, etc. This is in marked contrast to the deficit of $1,326,000 at the close of 1908. The annual report of the Southern Iron & Steel Co. shows that the company is making pig iron at a rate of approximately 20,000 tons per month, and at a cost materially below the estimates.

SIGNALING.

The Northern Pacific will soon put in service automatic block signals on 100 miles of line between Livingston and Laurel, in Montana. The signals are the General Railway Signal Co.'s Model 2-A type, three position, upper quadrant. The Northern Pacific is also ready to ask for bids on automatic block signals for 300 miles of double track to be installed on various parts of the road. Upper quadrant, three-position signals will be used throughout.

Telephones for Train Despatching.

The Boston & Maine is to use telephones for train despatching from Concord, N. H., to White River Junction, Vt., 70 miles, and from Concord to Woodsville, N. H., 95 miles. Each circuit will have 25 way stations. The first telephone train despatching circuit on the Boston & Maine was that between Boston and Fitchburg, 51 miles, installed last September. The officers of the road are reported to be planning to equip the entire system with telephones.

The Western Electric Company, which furnished the apparatus for these lines, reports that it has recently received orders from six important roads in the southern states: The Georgia Railroad, the Southern Railway, the Chesapeake & Ohio, the Norfolk & Western, the Seaboard Air Line and the Atlantic Coast Line. That of the Georgia Railroad was noticed in these columns last week. The Chesapeake & Ohio has completed the equipment of its Cincinnati division and expects soon to equip three other divisions.

Positive Hose Coupler Lock.

The Gold Car Heating & Lighting Company, New York, has recently developed a positive lock for steam train line couplers which can be very quickly tightened and loosened without the use of tools. It is a generally accepted notion that the couplers for air, signal and steam connections between cars should automatically separate in case the cars are

Fig. 1.

uncoupled or a break in two occurs. Most roads, however, require their trainmen to separate the hose couplings by hand when trains are broken, as pulling apart of couplings is more or less injurious to the hose. The shape and weight of the coupler heads in connection with the angle at which the hose is attached ordinarily maintains the gaskets in close contact when coupled, but at the same time permits automatic uncoupling.

The high speed of modern trains, together with the increased steam pressure often carried in the train line for operating electric generators in the baggage car, makes a positive lock, one that cannot be loosened and caused to leak by vibration or excessive pressure, desirable between engine and tender and also between engine and baggage car. The new lock here shown is designed to meet this requirement. Fig. 1 shows the couplers connected but not locked, Fig. 2 shows the lock in place, while Fig. 3 is a detail view of the locking pieces.

Fig. 2.

In the eye, cast in the coupler immediately over the gravity

Fig. 3.

relief trap and where the chain was sometimes attached, is inserted the pin-shaped end of the lock, which is secured with a cotter pin, as shown. The screws force the locks upwards when engaged, operating to pull the couplers tightly together as a toggle joint. The point of the screw bears against the body of the coupler and is riveted over to prevent working out of the lock. This malleable iron lock has sufficient play in the eye of the coupler to allow of ready connection. A few

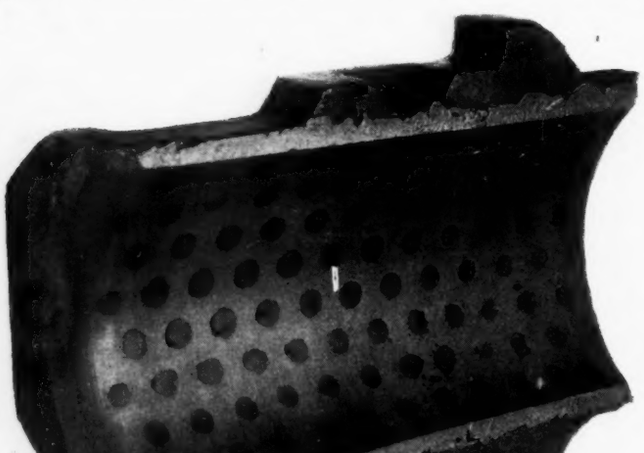
turns of the screws, which have large T heads, binds the couplers firmly together.

These locks are made for each size of coupler and are so designed that where couplers of different sizes will couple the locks will also operate properly. It is not necessary to confine these locks to the couplings at the head end of trains, however, and they may be used when desired between the various cars. This has been done on some of the large lines in the Northwest, where it was found that the additional security against leakage was more important than the automatic uncoupling if the train should part.

The cuts show the gravity relief trap which has been so favorably known for a number of years. It has been recently improved by widening the seat so that the gasket will maintain a smooth surface against the seat, preventing leakage due to wear. As this trap is operated by gravity, it simply falls open when pressure ceases, allowing the water of condensation in the train line to flow to the ground and avoid freezing. It also provides for reducing the time required to get steam at the rear of the train even in moderate weather, as there is no water in the pockets which would have to be driven to the end of the train line. Trainmen can always tell if pressure is on the line by simply tapping the valves, thus avoiding being scalded by hot steam when uncoupling. With this trap it is unnecessary to separate the hose coupling when the train is laid up, and in case of an unexpected cold night the hose it not ruined nor is delay caused when steam is turned on the next day. The life of the hose is also increased by reducing the amount of the twisting and bending necessary in the process of coupling and uncoupling.

Randall Graphite Sheet Lubricator.

The modern theory of lubrication is based upon the principle that the journal and bearing are slightly separated by the film of oil. Oil and greases simply form a temporary glaze, which must be in a continuous flow or they will wear,



Bearing Set with Randall Graphite Sheet Lubricator.

burn or be rolled out. Many efforts have been made to obtain this separation by the intervention of a softer material than the bearing itself, and the Babbitt metal manufacturers have spent large sums of money in the endeavor to mix graphite and soft metal. Engineers generally agree that graphite is an excellent lubricant, but the trouble has been to get it in the right place in the bearing and keep it there, especially in long bearings. With Randall's graphite sheet lubricator we have an ideal method of lubrication and remarkable results have been obtained. It is composed of pure graphite in the form of small tapered cones, which are held in bond and attached by hydraulic pressure to a fine copper wire screen. This mat with the raised cones of graphite is placed in the bearing and held tightly against it with a mandrel, after which the Babbitt metal is poured in. The illustration shows the appearance of the bearing when set with the graphite cones and after a service of 23,000 miles. It is claimed that this method of using graphite increases the life of Babbitted bearings 300 to 400 per cent., and it has been found possible to save 75 to 90 per cent. of the oils and grease necessary under the old method. This material is replacing bronze bushings in machinery and sheaves, and it is being adopted by machinery transmission manufacturers, steam railways for journal brasses on cars and locomotives, and steam and interurban railways for wheel and journal brasses and armature bearings.

There is strong testimony from experts as to the value of soft bearings for journals. One prominent motive power officer has said that the wear of car journal bearings is approximately 1 lb. of metal for every 25,000 miles. The wear of axles is about one-third as fast, and a deduction has been reached which shows that the aggregate cost of metal wear of axle journals is six times the amount of money spent to lubricate them, and the cost of the coal burned in overcoming their friction is double the cost of their lubrication. Therefore, in considering the running expense of machinery and the relief to be afforded in the matter of lubrication by the introduction of graphite bearings, the cost of oil must not only be considered but also the cost of the power and of the wear of metal from the bearing and journal themselves. The uniformity and permanency of graphite lubrication qualify it well for railway service where the element of friction is such an important matter. Further testimony from Prof. Denton is to the effect that if brasses are lined with some of the soft anti-friction metals the crushing down of grooves by a smooth journal does not cause excessive friction, and herein lies the true advantage of these metals. The chances of heating are less with soft anti-friction metals than with bare brass or hard white metal. To these may be added the testimony of Dr. Dudley, who said, "Alloys which may be called the softest give the best wear and with less loss of metal under the same conditions than harder or more brittle alloys."

The Randall graphite lubricator has been used on engine truck, trailer, tender and car bearings on the Southern Pacific lines in Oregon and other railways. It is also being used extensively on suburban electric lines. This lubricator is sold by the Strong, Carlisle & Hammond Company, 334 Frankfort avenue, Cleveland, Ohio, who is the sole selling agent for the United States.

Car Lighting Equipment.

The Safety Car Heating and Lighting Company, New York, is operating over 70 gas plants throughout the country, and owing to the large number of equipments sold during the past year and the great activity in transportation the gas sales are now the largest in the history of the country. A very large number of the railways are still exclusively using Pintsch gas, a product controlled by this company. There is at present a demand for electrical equipment for car lighting, and the Safety company has received a large portion of this business during the past year. This company makes an axle-driven dynamo, having a very efficient battery, which is said to meet all the conditions of service. The company's plants are equipped for storing and general repairs to the electric equipment in service, utilizing its present force and making a rental proposition which is said to be in practice quite generally among the leading railways of the country.

This company has, since January 1, taken contracts from the government for Pintsch buoys to the extent of several hundred thousand dollars. Its latest steam heating equipments are being applied very generally throughout the country, and it is said to have recently received one of the largest orders ever placed for steam heating equipment. This general increase has led to the company's making large increases in its manufacturing establishments in New York, Jersey City, N. J.; Pittsburgh, Pa.; St. Louis, Mo.; Montreal, Can., and Mexico City, Mex.

This company makes a specialty of designing railway gas and electric fixtures, and the increased demand for this product during the past year has been met by a new plant built exclusively for meeting the requirements of high-class fixtures to harmonize with the interiors of present day coach equipment.